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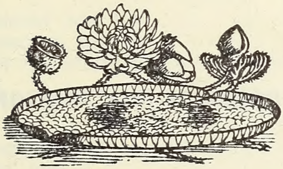

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ERRATA

p. 62, line 4 : *For* Llanbwlehyllyn read Llanbwlchyllyn.
p. 72, line 6 up : *For* 407/1 read 407/I.
p. 83, line 11 : *For* 88, MID-PERTH read 89, E. PERTH.
p. 203, line 2 up : *For Galeopsis etrahit* read *Galeopsis tetrahit.*
p. 247, line 4 up : *For* 'out of several hundreds' read 'they are'.
line 5 up : *For* eight read eighty.
p. 249, line 16 up : *For* ARENARIA AILIATA read ARENARIA CILIATA.
p. 270, line 2 up : *For* WEBB, D. H., read WEBB, D. A.
p. 367, line 15 : *For* 50-80 cm and 40 cm read 50-80 mm and 40 mm.
p. 367, line 3 up : *For* ensiform read reniform.
p. 384, line 15 : *For R. sherardi* read *R. sherardii.*
p. 402, line 19 up : *For* ANTHYLLIS VULVERARIA read ANTHYLLIS VULNERARIA.

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RIT. HERB.

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Continued on inside of back cover.

THE FLORA OF HYDE PARK AND KENSINGTON GARDENS, 1958-1962

By D. E. Allen

Hyde Park and Kensington Gardens, which jointly form a giant oasis of 636 acres near the centre of London, miles from the open country, have perhaps been investigated by botanists more minutely and over a longer period of time than any comparable area in the British Isles. Quite apart from the intrinsic interest of the wild—and now very large adventive—flora of two parks that are so blatantly unrural and which have been used so intensively by the public for so many years, they are also of some importance in botanical history in having formed the subject of possibly the first detailed account of a weed flora published in this country—by J. B. Leicester Warren (later Lord de Tabley) in 1871.

Historical Background

Hyde Park was formerly the southern end of a wedge of wooded pastureland which covered the area watered by the Westbourne and the Tyburn, two minor tributaries of the Thames, and which extended northwards by way of what is now Regent's Park to Highgate. Even to-day such fragments of the old turf that remain support a vegetation still faintly discernible as the one-time ground-flora of an oakwood. In 1536 this area was reserved as a royal hunting forest by Henry VIII, and the land has remained Crown property—except for a year or two during the Commonwealth—ever since. Queen Elizabeth I started the custom of holding military reviews in the park, but it was not until the reign of James I that the public were first freely admitted. In 1643, during the Civil War, it no doubt suffered heavily when Parliament ordered the felling of trees in the Royal Parks, to supply the fuel that London was denied by the Royalist blockade. Some fifty years later, twenty-six acres were wrenched from it by William III to form a setting for Kensington Palace, and these, enlarged tenfold and extensively replanned in the reigns of George I and George II, became in time the separate and self-contained western half of the once-single park under the name of Kensington Gardens.

The earliest records of the wild flora are three given by Christopher Merrett in his *Pinax* (1666): *Cerastium glomeratum, Montia fontana* (which he described as frequent) and *Luzula campestris*. Of these only the last can still be found. It was about this time, as we know from the diaries of Evelyn and Pepys, that the park began to become the parade-ground of fashionable society, a development which may well have touched off the g, ruthless 'tidying-up' process that has continued, with steadily increasing efficiency, down to the present.

The Serpentine, the greatest fruit of this urge to improvement, was created in 1730 by damming the Westbourne. *Potamogeton pectinatus,* recorded by Hudson (1762), was the first of several aquatic species to appear here—and later also in the Round Pond, which is fed from the Serpentine. Though boating was permitted to the public from 1847, the Serpentine could still produce, over twenty years later (Warren, 1871) great quantities of *Potamogeton pusillus, Zannichellia palustris, Elodea canadensis, Myriophyllum spicatum* and *Polygonum amphibium.* To-day most of these still survive in the Round Pond, but the Serpentine is quite barren.

Warren's list of 1871—observing, it should be noted, more stringent criteria of wildness than would be customary to-day—comprised 153 species of flowering plants and ferns recently seen in the two parks by himself, together with a further 10 contributed by the Rev. W. W. Newbould. 25 species recorded in the earlier literature were not refound; most of them, presumably, had even by then become extinct. Four years later (Warren, 1875) another 18 species were added. Both the list and its supplement, very fortunately, include notes on frequency and, for the rarer species, precise localities, so that here there is an invaluable base-line against which all subsequent work can be measured.

Of the 181 species in all, found either by Warren or by Newbould, as many as 33 have not been reported since. Many of these are marsh or aquatic species, whose habitats have been either destroyed or irreparably altered. One or two others, most notably *Trifolium glomeratum,* were found in old turf that has long since been worn away by trampling and replaced by artificial mixtures—a process already under way by 1833 (Denison, 1835). Still others, like *Molinia caerulea* (brought in with peaty soil for rhododendrons) and *Puccinellia distans* (in new-laid turf), were obvious freak occurrences less likely to slip through in similar ways to-day. On the other hand, though the list includes *Agrostemma githago* and *Elodea canadensis,* both of which have ceased to be such prevalent plants as they were in the England of the 1870s, it contains no mention of such characteristic modern London weeds as *Coronopus didymus, Chenopodium ficifolium, Chamaenerion angustifolium, Senecio squalidus, S. viscosus, Lactuca serriola* and, inevitably, *Galinsoga parviflora, G. ciliata, Matricaria matricarioides* and *Epilobium adenocaulon. Conzya canadensis* was at best rare and *Mercurialis annua* only represented by a single plant. It would seem from this that, as the Metropolis has sprawled and the country become more and more distant, many of the 'old' weeds—*Ranunculus ficaria, Cerastium fontanum* subsp. *triviale, Vicia cracca, Myosotis arvensis, Euphorbia helioscopia, Arrhenatherum elatius,* all found fairly frequently by Warren—have tended to decrease and a 'new' weed flora, much more markedly alien in character, has gradually spread and risen to dominance in their place.

During the Second World War the parks, in the words of Church (1956), broke into "a scurf of allotments, camps, anti-aircraft and radar emplacements, and other un-idyllic sores". Extensive areas of the remaining natural turf were dug up and the shortage of labour allowed weeds to flourish almost unchecked. Several unusual species, notably *Carum carvi, Gnaphalium sylvaticum* and *Poa palustris,* turned up on air-raid shelters in 1945. Shortly afterwards, in 1947-49, before the parks had been wholly restored to their normal peacetime condition, Kent (1950) carried out a second detailed survey, resulting in a list of 136 species, to which a further 4 were added later (Kent, 1960). This was based on only about a score of visits and was regarded as "by no means a complete account". 49 of the species found were not in Warren's list, but 3 of these were probably planted and a further 7 would doubtfully have been admitted by Warren.

It was under the stimulus of this list of Kent's that a third detailed survey, here reported upon, was undertaken in 1958-62. During these five summers I explored the parks on average at least once a week and combed every part accessible to the public —as well as several of the more promising of the railed-off enclosures, with the aid of a permit from the Ministry of Public Buildings and Works. Despite this I am aware of still having missed several species, which, too immature or too far-off for confident determination, have been lost prematurely through either the remorselessness of the gardeners or the pressures of dignity imposed on one by the special goldfish-bowl quality of park botanising.

In all, 309 species and hybrids have been noted this time, as against 181 found by Warren and Newbould and 140 by Kent. This higher total does not necessarily indicate a permanently richer flora (probably the reverse is true), but is explained partly by the greater length and intensity of this survey compared with its predecessors and partly by the accident that it chanced to coincide with the drastic roadwork alterations that affected the whole eastern edge of Hyde Park in 1960-62. While the latter has meant that the period covered by this survey is thus in some degree abnormal, it has nevertheless also been valuable for revealing the range and number of species that can be expected to come in when opportunities for introduction are at their greatest. The coincidence of the survey has also meant that a thorough record of new arrivals through this medium has been kept, so that should any become permanently established in the parks from now on, their origin has at least been usefully documented.

RECENT CHANGES

In the short space of the nine years since the end of Kent's survey, the flora has evidently altered very considerably. Apart from aquatics only six of the numerous less common species localised in his list are still to be found in what are recognisably the same stations: *Silene vulgaris* (east bank of the Serpentine), *S. dioica, Chenopodium rubrum, Dipsacus fullonum* (now reduced to one plant), *Tragopogon pratensis* and *Carex ovalis.* Several other species, however, have been detected in what are evidently the same stations in which Warren found them in the 1870s, and unless these are re-arrivals (which seems unlikely) it seems probable that Kent overlooked them. These are *Ranunculus sceleratus, Polygonum amphibium, Lycopus europaeus* (all three in different places at the edge of the Serpentine), *Chamaemelum nobile* (Kensington Palace lawn), *Taraxacum laevigatum* and *Carex hirta* (both on the dry strip north of the Magazine).

The following seventeen species recorded by Kent have not been refound:—

Ranunculus ficaria
Brassica juncea
Cardamine flexuosa
Geranium dissectum
Melilotus alba
Vicia sepium
Lathyrus pratensis
Torilis japonica
Foeniculum vulgare
Calystegia silvatica
Veronica chamaedrys
Hieracium exotericum
Potamogeton pectinatus
Bromus lepidus
Brachypodium sylvaticum
Deschampsia cespitosa
Agrostis canina

A high proportion of these are perennial species, which were doubtless eradicated when the lax wartime state of the parks was eventually corrected. Furthermore, all but three have been recorded from at most only one other locality in Inner London in recent years (Kent, 1960, 1962). Even *Calystegia silvatica,* which one would expect to be widespread, is curiously absent to-day from the central parks, where its place is taken by *C. sepium.*

Several species, mostly grasses, have also become noticeably much scarcer since the time of Kent's survey. *Bromus mollis* and *Anisantha sterilis,* both recorded as common, are now, quite inexplicably, extremely rare; only two specimens have been found of *Lolium multiflorum,* which Kent was able to describe as frequent; and neither *Agropyron repens* nor *Hordeum murinum* could now be termed "abundant". Similarly, *Epilobium obscurum* and *Polygonum convolvulus* are now occasional instead of "common".

On the other hand, a considerably larger number of species which Kent recorded from two localities at most can now be regarded as frequent to locally abundant:—

Ranunculus repens
Coronopus didymus
Sagina procumbens
Atriplex hastata
Epilobium adenocaulon
Aethusa cynapium
Urtica urens
U. dioica
Plantago lanceolata
Galium aparine
Hypochoeris radicata
Sonchus arvensis
Poa pratensis
P. trivialis
Cynosurus cristatus
Phleum bertolonii

The majority of these changes are surely more apparent than real, the result of more intensive field-work. There do genuinely, however, seem to have been big increases in *Coronopus didymus* and *Epilobium adenocaulon*—as also in the two *Galinsoga* species. And the same is presumably true of so conspicuous a species as *Epilobium hirsutum,* the former solitary record for which (as also for *Cerastium fontanum* subsp. *triviale, Medicago lupulina* and *Carex hirta*) can now be multiplied tenfold.

This pattern of abrupt and relatively dramatic increases and decreases in only a limited number of species, while the populations of most of the rest remain fairly constant, is perhaps the most striking finding to emerge from the new survey. It is not only deducible from these comparisons with Kent's data, but has also been observed in the field. Almost every year seems to be characterised by an "explosion" on the part of one species or another. Thus 1960 was the year of *Lamium purpureum,* 1961 of *Epilobium adenocaulon,* 1962 of *Arabidopsis thaliana* (which also fared noticeably well then in many other parts of the British Isles) and *Gnaphalium uliginosum.* This kind of phenomenon has often been noted in aquatics, but terrestrial floras, and particularly weed floras, tend to hide such things by their very diversity and are seldom sufficiently closely and continuously watched over for these sizeable year-to-year swings in numbers to be revealed. The causes of the swings are clearly various: some, as in the case of *Gnaphalium uliginosum,* seem to be simply the result of fresh soil from a newly-imported central dump being laid over many different areas of the park: but most are doubtless the result of minor fluctuations in weather conditions, in particular, favourable conditions coinciding with the brief fruiting period. These periods, in fact, seem so brief and critical that the timing by the gardeners of their weeding-cycle must also be quite a significant biotic factor. Indeed it may not be letting imagination run too wild to visualise a situation in which a strike among the gardeners, falling at the crucial stage in the fruiting of certain species, could at once materially alter the composition of the flora of Inner London.

By no means all species that have spread, however, fall into this category. A few, of which *Coronopus didymus* and *Mercurialis annua* are the outstanding examples, exhibit a more or less continuous distribution from bed to bed over a strictly limited area and show every sign of being in the process of slowly spreading year by year. This was no doubt also the case in the past with *Circaea lutetiana,* only a single plant of which was seen by Warren but which is now a common and most characteristic member of a group of shade colonists—others are *Silene dioica, Moehringia trinervia, Rubus separinus, Geum urbanum, Anthriscus sylvestris, Stachys sylvatica, Rumex sanguineus* and *Hieracium strumosum*—which all unnoticed have spread in and now provide the shrubberies with a peculiar flora of their own.

MODES OF INTRODUCTION

A further factor causing the flora to vary in composition from year to year is the variation in the means by which certain species are brought into the parks or redistributed within them once established. Imported soil, in particular, has shown itself to be far more important in this respect than is generally realised. For species not forming part of the regular flora of Inner London (and thus by inference brought in from afar) this seems in fact much the most important single means of introduction. In some cases the soil is evidently of alluvial origin, bringing in such unexpected species as *Polygonum hydropiper* and *Alopecurus geniculatus*. Other soil, such as that used widely for filling in various trenches and holes in the winter of 1961-62, must come from light, sandy arable ground, to judge by the sudden irruption of *Scleranthus annuus, Aphanes microcarpa, Kickxia spuria, K. elatine* and *Anthemis arvensis.* On the other hand it may be with soil attached to the roots of shrubs or bedding plants rather than with soil imported in the mass that *Montia perfoliata* and *Aegopodium podagraria* have been brought in. In one instance, even, the soil responsible for producing unusual weeds has almost certainly emanated from within the park itself: *Ranunculus scleratus, Rorippa islandica* and *Juncus bufonius* have all appeared for at least four years running in one border beside the Serpentine and seem most likely to have germinated from mud dredged up at some time from the lake bottom and strewn on the nearest beds.

The constant work of renovation, naturally varying in character and extent from year to year, does not merely involve new soil. After a long, dry summer, verges have to be extensively resown: in 1959 this produced a temporary profusion of *Hordeum secalinum.* Worn-out turf has to be replaced, old shrubberies replanted, diseased trees uprooted. The more botanically unpromising the alteration, it almost seems, the more outlandish the species introduced: the ring of soil at the base of a newly-planted tree has produced the only specimen of *Datura stramonium,* while fresh gravel brought in for repairing a path was presumably responsible for *Plantago maritima.*

A new major source of introduction, not or scarcely apparent at the time of Kent's survey, is the scattering of commercial seed mixtures now widely sold for feeding to birds. About a dozen species, including *Bupleurum lancifolium, Helianthus annuus, Salvia reflexa* and *Lolium rigidum,* have begun to appear from this cause, especially at the edges of paths. Birds themselves are doubtless responsible for the occasional plants of *Pisum sativum* and the solitary *Pastinaca sativa* that have also occurred on path-edges as well as more obviously for the berry-bearing shrubs and *Solanum* species. The rejectamenta of human snacks, on the other hand, seem the most probable origin of *Vitis vinifera, Rubus idaeus, Fragaria ananassa, Prunus avium, Malus sylvestris* and *Lycopersicon esculentum.*

Human footwear, as Clifford (1956) has demonstrated, is another extremely important means of dispersal. *Matricaria matricarioides* and *Juncus tenuis* are two species that no doubt entered and spread in this way, and the single path-side occurrence of *Vulpia bromoides* (which features in two of Clifford's lists) is also suggestive in this connection. Similarly, *Agrimonia eupatoria, Galium aparine* and the species of *Arctium* doubtless owe their presence and spread to country clothes worn in the parks, to the tramps for whom this is a popular east-west corridor, and to the shaggier types of dogs. The agency behind the great spread of *Circaea lutetiana,* already remarked upon, is problematical; it may have been dogs, birds or the gardeners themselves.

Lastly, one should not ignore the increasing variety of plants under cultivation in the parks, many with the chance of being thrown out and temporarily establishing themselves, like *Phaseolus coccineus* and *Mentha spicata,* others of running completely out of control, like *Oxalis corymbosa, Rubus procerus, Heracleum mantegazzianum* and *Polygonum cuspidatum.* These last are now, in effect, as much members of the weed flora as species that have come in from the wild.

List of Species

Many of the records in the following list have already been published, mostly without detailed localities, in Kent (1960, 1962). A large number of them have been made in the company of D. H. Kent and D. McClintock, to both of whom I am indebted for much help with determinations and for commenting on the manuscript of this paper. R. S. R. Fitter, J. E. Lousley, J. J. Potter and Miss R. Rönaasen have also joined me in my searches on one or more occasions and I should like to take this opportunity of thanking them for their interest and assistance.

The following signs and abbreviations are used:—

*	Not recorded by Kent.
**	Not recorded by *either* Kent *or* Warren.
H.	Hyde Park.
K.	Kensington Gardens.

Species which are frequent to abundant are listed without comment.

*PTERIDIUM AQUILINUM (L.) Kuhn. H., K., seven records. Apparently increasing.

**DRYOPTERIS FILIX-MAS (L.) Schott. K., walls round Magazine; one in stonework at head of Serpentine; two in enclosure W. of Albert Hall; one at Prince of Wales Gate.

RANUNCULUS ACRIS L. H., K., here and there, only singly.

R. REPENS L.

*R. BULBOSUS L. H., Police Station lawn: lawn at Byron Statue.

*R. SCELERATUS L. H., patch in shrub border at S.-E. end of Serpentine bridge, 1958-62; one in dahlia border W. of Marble Arch, 1958. K., N. shores of Serpentine, 1958.

**PAPAVER RHOEAS L. H., sporadic near Dorchester Hotel, 1958-61.

var. STRIGOSUM Boenn. H., one on waste ground W. of Marble Arch, 1962.

**P. SOMNIFERUM L. H., K., singly or in patches in borders, mainly along the S. side of the parks. Probably a bird-seed derivative (included in mixtures as "Blue Maw").

**CORYDALIS LUTEA (L.) DC. H., one on soil dump near Marble Arch, 1962.

**FUMARIA OFFICINALIS L. H., several on waste ground by Marble Arch and on soil dump near Dorchester Hotel, 1962. K., one on soil dump N. of Magazine, 1961.

**BRASSICA OLERACEA L. H., one on waste ground by Marble Arch, 1961. Derived from bird-seed.

**B. RAPA L. H., one in border by North Lodge, 1958; odd specimens in shrub borders by E. and W. ends of Serpentine bridge, 1962.

SINAPIS ARVENSIS L. Only recorded once by Warren, now common.

**f. ORIENTALIS (L.) Aschers. H., Bird Sanctuary, 1962.

S. ALBA L. H., three in shrubbery by Albert Gate, 1962.

**RAPHANUS RAPHANISTRUM L. var. RAPHANISTRUM H., waste ground by Park Lane, 1960, and W. of Marble Arch, 1962.

var. OCHROLEUCUS (Stokes) Peterm. H., one on rubble at E. end of Rotten Row, 1961.

CORONOPUS SQUAMATUS (Forsk.) Aschers. H., patch beside Bayswater Road near Marble Arch, 1958-61. Also singly in five other places.

C. DIDYMUS (L.) Sm. H., locally plentiful in borders in the central part, gradually infiltrating into the eastern side of K.

CAPSELLA BURSA-PASTORIS (L.) Medic.

**ARMORACIA RUSTICANA Gaertn., Mey. & Scherb. H., Nursery tip, 1961. K., one at edge of shrubbery near Hyde Park Gate, 1958-62.

**CARDAMINE HIRSUTA L. H., one in dahlia border W. of Marble Arch, 1958. K., shrub border by Lancaster Gate, 1961.

**BARBAREA VULGARIS R.Br. H., two under railings by new subway opposite Grosvenor House, 1962.

RORIPPA SYLVESTRIS (L.) Bess. H., near Marble Arch and in border by Apsley House, 1958.

R. ISLANDICA (Oeder) Borbás. H., K., odd specimens by Serpentine and in Magazine-Bird Sanctuary area.

ERYSIMUM CHEIRANTHOIDES L. H., K., in several places, singly or in patches, 1960-62.

SISYMBRIUM OFFICINALE (L.) Scop.

var. LEIOCARPUM DC. H., several on waste ground by Park Lane and at Marble Arch, 1960-62, conspicuously greener and more robust than the more common plant.

**S. ORIENTALE L. K., one in border E. of Lancaster Gate, 1961.

**S. ALTISSIMUM L. H., three under railings by new subway opposite Grosvenor House, 1962, a very hirsute form with arcuate-recurved siliquae.

**ARABIDOPSIS THALIANA (L.) Heynh. H., K., in various places in 1962.

**CLEOME SPINOSA L. H., one on rubble at E. end of Rotten Row, 1962. K., several on soil dump N. of Magazine, 1961.

**RESEDA LUTEOLA L. H., several on waste ground by Marble Arch, 1962. K., patch in border on S. side of Magazine.

**R. LUTEA L. H., one on disturbed ground near North Lodge, 1960, a curious autumnal form (det. at KEW).

**VIOLA ARVENSIS Murr. K., soil dumps N. of Magazine, 1961, and beside Temple Lodge, 1962.

**HYPERICUM PERFORATUM L. K., one at edge of path by Black Lion Gate, 1960.

SILENE VULGARIS (Moench) Garcke. H., Bird Sanctuary. K., edge of lawn on E. bank of Serpentine; one in shrubbery by Black Lion Gate, 1959; one in turf between Round Pond and Palace, 1960.

S. DIOICA (L.) Clairv. H., still in the Bird Sanctuary, which was Kent's locality.

S. ALBA (Mill.) E. H. L. Krause. H., Nursery and Bird Sanctuary; singly near Marble Arch and Hyde Park Corner, 1958-62.

CERASTIUM FONTANUM subsp. TRIVIALE (Link) Jalas (*C. holosteoides* Fr.). H., K., here and there, including two different soil dumps. Usually singly, but in patches in turf on N.-W. bank of Serpentine.

STELLARIA MEDIA (L.) Vill.

*S. GRAMINEA L. H., two on new traffic island N. of Apsley House, 1961.

*SAGINA APETALA Ard. K., one large plant in a crevice beside the Fountains, 1961.

S. PROCUMBENS L. H., K., frequent on paths and in lawns. K., abundant on wall round sunken garden by Kensington Palace.

MOEHRINGIA TRINERVIA (L.) Clairv. H., enclosure by café, 1958. K., patch in shrubbery at W. end of Long Walk, 1961.

*SPERGULA ARVENSIS L. H., K., four solitary occurrences on new-laid soil.

*SPERGULARIA RUBRA (L.) J. & C. Presl. H., patches on soil dump by Dorchester Hotel, 1961, and on waste heaps by Marble Arch, 1961-62.

**SCLERANTHUS ANNUUS L. K., new soil patches beside Temple Lodge and S.-E. of Speke Memorial, 1962.

**MONTIA PERFOLIATA (Willd.) Howell. H., border at S.-W. end of Serpentine bridge, 1959-60. K., in plenty in tulip border by Victoria Gate, 1962.

*CHENOPODIUM POLYSPERMUM L. H., K., in many places, sometimes plentiful, especially in borders. Apparently increasing.

C. ALBUM L.

C. FICIFOLIUM Sm. Not uncommon in borders and on soil dumps. H., abundant in shrub border at S.-E. end of Serpentine bridge, 1960-62.

*C. MURALE L. H., one under railings near Marble Arch, 1962. K., several on soil dump N. of Magazine, 1961.

C. RUBRUM L. H., K., seven records, in three cases under suspicion of introduction with mud from the Serpentine. Frequent among duck droppings beside Buckingham Palace lake.

**BETA VULGARIS L. H., soil dump W. of Marble Arch, 1962.

*ATRIPLEX PATULA L. H., K., six records.

A. HASTATA L. Frequent. Only once recorded by Kent and not at all by Warren.

*MALVA SYLVESTRIS L. H., K., on soil dumps and new-laid soil, mainly in 1959 and 1961.

**M. NEGLECTA Wallr. K., one by Fountains, 1958.

**M. PARVIFLORA L. K., one on soil dump N. of Magazine, 1961 (conf. J. E. LOUSLEY).

**ALTHAEA ROSEA (L.) Cav. K., soil dump N. of Magazine, 1961-62; weed in border E. of Lancaster Gate.

**LINUM USITATISSIMUM L. H., enclosure by café, 1958. K., path-side E. of Lancaster Gate, 1959. Derived from bird-seed.

*GERANIUM MOLLE L. H., K., four records, mainly on new-laid soil.

**OXALIS CORYMBOSA DC. H., K., border weed along N. edge of the parks, at intervals; also in Long Walk borders and Bird Sanctuary.

ACER PSEUDOPLATANUS L.

**AESCULUS HIPPOCASTANUM L. } K., seedlings in plantation on E. bank
**ILEX AQUIFOLIUM L. } of Serpentine.

**VITIS VINIFERA L. H., one on rubble at Hyde Park Corner, 1962.

**LABURNUM ANAGYROIDES Medic. Occasional seedlings.

MEDICAGO SATIVA L. H., one on roadside N. of Apsley House, 1962.

M. LUPULINA L. H., K., ten records, mostly singly.

**M. ARABICA (L.) Huds. H., one on waste ground by Marble Arch, 1962.

MELILOTUS OFFICINALIS (L.) Pall. H., one on waste patch by Hyde Park Corner, 1962.

TRIFOLIUM PRATENSE L.

T. HYBRIDUM L. subsp. HYBRIDUM K., one in Magazine enclosure, 1958; one on soil dump N. of Magazine, 1962.

T. REPENS L.

T. DUBIUM Sibth. Five records. K., apparently established in turf beside Serpentine Road by café.

*T. MICRANTHUM Viv. H., one on waste ground by Marble Arch, 1962.

*LOTUS CORNICULATUS L. H., singly in enclosure by bandstand, 1959-61. K., several in lawn on E. bank of Serpentine and in turf between Round Pond and Palace. Large solitary plants in turf next to Magazine enclosure and on a verge by Black Lion Gate are of a distinct form (of alien origin?) simulating *L. tenuis* Waldst. & Kit., evidently introduced with grass seed.

ROBINIA PSEUDOACACIA L. Occasional seedlings.

*ORNITHOPUS PERPUSILLUS L. H., three on bare ground by Marble Arch with *Aphanes microcarpa*, 1962.

*VICIA HIRSUTA (L.) Gray. H., K., one record each year, in different borders.

V. CRACCA L. K., Magazine enclosure, 1958-61; soil dump N. of Magazine, 1961.

V. ANGUSTIFOLIA L. H., two on waste ground W. of Marble Arch, 1962.

**PHASEOLUS COCCINEUS L. K., soil dump N. of Magazine, 1961.

**PISUM SATIVUM L. H., K., four records, mainly on path-sides, probably introduced by pigeons.

**RUBUS IDAEUS L. K., one under thorn hedge at N.-E. corner of Serpentine.

**R. LACINIATUS Willd. H., one on embankment by lido, 1961.

**R. SEPARINUS Genev. H. Bird Sanctuary. K., abundant in enclosure on E. bank of Serpentine; Magazine enclosure; Temple Lodge (conf. E. S. EDEES & B. MILES). This is the "*Rubus* sp." of Kent's list. Curiously not in Buckingham Palace gardens, where the main species is *R. rubritinctus* W .C. R. Wats.

**R. PROCERUS P. J. Muell. H., head of Serpentine; Bird Sanctuary. K., Temple Lodge; several in enclosure on E. bank of Serpentine (det. B. MILES). Erroneously listed in Kent (1960) as *R. pseudobifrons* Sudre.

**R. sp. K., Magazine enclosure. Species unrecognised by E. S. EDEES or B. MILES.

**POTENTILLA ANSERINA L. H., several round new subway exits at Marble Arch, 1962; one on track from Ranger's Lodge to Magazine, 1958. K., one in shrub border by Lancaster Gate, 1958.

**P. ERECTA × REPTANS. H., patches on embankment E. of lido, 1962, a form of this cross closely resembling *P. anglica* Laichard., but not, I believe, the true *P. anglica*. K., one on rough lawn next to Dog's Cemetery, 1958, a very small-flowered plant at first recorded as *P. erecta* (L.) Räusch. (Kent, 1960) but now considered more probably a form of this cross; I have seen similar plants on bombed sites.

P. REPTANS L.

**FRAGARIA ANANASSA Duch. H., one on path-side near Speakers' Corner, 1961.

**GEUM URBANUM L. K., two at edge of shrubbery N. of Temple Lodge, 1958.

AGRIMONIA EUPATORIA L. K., one among bushes on N.-E. bank of Serpentine.

*APHANES MICROCARPA (Boiss. & Reut.) Rothm. H., large patch on bare ground by Marble Arch, 1962. K., on soil patches beside Temple Lodge and S.-E. of Speke Memorial, 1962. Warren recorded *A. arvensis* in the aggregate sense.

[ROSA SP. The unidentified bushes mentioned by Kent (actually pubescent-leaved *R. canina* L.) have clearly been planted.]

**PRUNUS SPINOSA L. H., Magazine enclosure.

**P. AVIUM (L.) L. K., seedlings on N.-E. side of Serpentine and near cafe.

**P. AMYGDALUS Batsch. H., seedling on rubble by Hyde Park Corner (det. D. MCCLINTOCK).

**CRATAEGUS MONOGYNA Jacq. Seedlings occur. K., bush among rubble in Magazine enclosure.

**MALUS SYLVESTRIS subsp. MITIS (Wallr.) Mansf. H., seedling on new traffic island N. of Apsley House, 1961.

**RIBES UVA-CRISPA L. K., two among bushes on N.-E. side of Serpentine.

EPILOBIUM HIRSUTUM L. H., K., nine records, including an albino plant by Lancaster Gate in 1961. Not recorded by Warren.

E. PARVIFLORUM Schreb. K., one in shrub border by Lancaster Gate, 1961.

E. MONTANUM L. Only once recorded by Warren, now common.

**E. MONTANUM × ROSEUM. K., enclosure N. of Temple Lodge, 1958 (det. G. M. ASH).

E. ROSEUM Schreb. K., around the Fountains and in nearby enclosure N. of Temple Lodge; W. of Black Lion Gate, 1960.

E. ADENOCAULON Hausskn.

E. OBSCURUM Schreb. Only once recorded by Warren, now not uncommon.

CHAMAENERION ANGUSTIFOLIUM (L.) Scop.

**OENOTHERA BIENNIS L. H., Hyde Park Corner extension, 1961-62.

**O. PARVIFLORA L. H., with the above, 1961-62.

CIRCAEA LUTETIANA L.

*MYRIOPHYLLUM SPICATUM L. K., Round Pond, in profusion from 1959 onwards.

**HEDERA HELIX L. Introduced, now running wild.

**ANTHRISCUS CAUCALIS Bieb. H., one in turf between Serpentine and Dorchester Hotel, 1961.

A. SYLVESTRIS (L.) Hoffm. H., Bird Sanctuary. K., a large and increasing colony between Lancaster and Victoria Gates; one in enclosure on W. side of Serpentine, 1961.

**CAUCALIS sp. H., one under railings of shrub border N. of lido, 1962 (unfortunately lost in post when being sent in for the species to be determined). A bird-seed derivative.

**CONIUM MACULATUM L. H., six records, most notably in two places in turf by Ranger's Lodge. Apparently increasing.

**BUPLEURUM LANCIFOLIUM Hornem. H., K., single specimens under railings on W. bank of Serpentine, 1962 (conf. D. MCCLINTOCK).

*CONOPODIUM MAJUS (Gouan) Loret. K., small patch in late-cut grass midway between Lancaster Gate and Fountains. Common and widely distributed in the Gardens in 1871, according to Warren.

**AEGOPODIUM PODAGRARIA L. K., one in shrub border by Lancaster Gate, 1958-61.

AETHUSA CYNAPIUM L.

**PASTINACA SATIVA L. var. SATIVA. K., one under railings by cafe, 1961.

HERACLEUM SPHONDYLIUM L. H., four records, all singly except for a patch by road near Prince of Wales Gate.

H. MANTEGAZZIANUM Somm. & Levier. Now spread to: H., Bird Sanctuary. K., opposite Lancaster Gate Station; turf near Queen's Gate.

*MERCURIALIS ANNUA L. H., now very widespread. K., as yet only in borders by the Fountains.

*EUPHORBIA HELIOSCOPIA L. H., K., four records, including several under railings along Park Lane, 1962.

*E. PEPLUS L. H., common at S. end of Serpentine bridge. K., in borders round the outer edges of the Gardens, in places abundantly.

**E. EXIGUA L. K., new soil patches beside Temple Lodge and S.-E. of Speke Memorial, with *Scleranthus annuus, Kickxia elatine,* etc., 1962.

POLYGONUM AVICULARE L.

**P. ARENASTRUM Bor. Commoner than the preceding species.

*P. AMPHIBIUM L. H., patch in turf on Crystal Palace site near bowling greens. K., patch at water's edge at end of lawn on E. bank of Serpentine (Warren's locality).

P. PERSICARIA L.

P. LAPATHIFOLIUM L. H., several records, especially plentiful along new road parallel to Park Lane, 1962.

*P. HYDROPIPER L. H., one on soil dump opposite Dorchester Hotel, 1960. K., one on soil dump N. of Magazine, 1961.

P. CONVOLVULUS L. Common according to Kent, now only occasional. Only recorded once by Warren.

**P. CUSPIDATUM Sieb. & Zucc.

**P. POLYSTACHYUM Wall. ex Meisn. K., several at back of long Walk shrubbery N. of Palace Gate.

RUMEX ACETOSELLA L. H., K., seven records.

**R. TENUIFOLIUS (Wallr.) Löve. K., patch in old turf above path on E. side of Serpentine (conf. J. E. LOUSLEY). New to v.c. 21.

*R. ACETOSA L. H., E. side of Serpentine from the bridge to past the lido and elsewhere. K., by Lancaster Gate, 1958.

R. CRISPUS L. H., four records.

R. OBTUSIFOLIUS L.

*R. SANGUINEUS var. VIRIDIS Sibth. H., plentiful in Bird Sanctuary. K., shady enclosures on N.-E. side of Serpentine and N. of Temple Lodge.

URTICA URENS L. Now widespread.

U. DIOICA L.

**PLATANUS × HYBRIDA Brot. H., seedlings in beds and on waste ground near Hyde Park Corner.

**BETULA PENDULA Roth. H., two on waste patches near Hyde Park Corner, 1962.

**B. PENDULA × PUBESCENS. Planted birches seem to be this. H., K., solitary seedlings in Bird Sanctuary and Magazine enclosure. This is probably the "*Betula* sp." of Kent's list.

**CARPINUS BETULUS L. K., seedling under hedge of enclosure on E. bank of Serpentine.

**CASTANEA SATIVA Mill. K., seedlings in border E. of Lancaster Gate and beside Magazine, 1960-62.

**QUERCUS CERRIS L. H., waste ground W. of Marble Arch, 1962.

Q. ROBUR L.

*SALIX CAPREA L. H., waste ground round Hyde Park Corner and Marble Arch, 1961-62. K., bush in Magazine enclosure; seedling on pathside between Victoria and Lancaster Gates, 1960.

**S. AURITA × CINEREA. H., two among rubble by Hyde Park Corner, 1962 (det. R. D. MEIKLE).

*ANAGALLIS ARVENSIS L. H., K., eight records, especially on new-laid soil.

**BUDDLEJA DAVIDII Franch. H., waste ground near Marble Arch, 1961; patch at E. end of Rotten Row, 1961-62.

*FRAXINUS EXCELSIOR L. H., K., occasional seedlings, including in stonework at both ends of Serpentine.

**HELIOTROPIUM PERUVIANUM L. K., soil dump N. of Magazine, 1961.

*CONVOLVULUS ARVENSIS L. H., six records. K., by Alexandra Gate, 1958.

*CALYSTEGIA SEPIUM (L.) R.Br. H., Bird Sanctuary. K., in several places, on shrubs and palings, near Hyde Park Gate; on shrubs on N.-W. margin of Serpentine; and elsewhere. Kent recorded only *C. silvatica* (Kit.) Griseb.

**HYOSCYAMUS NIGER L. H., about twenty rosettes on newly-levelled ground over new car-park, 1962.

**LYCOPERSICON ESCULENTUM Mill.

SOLANUM DULCAMARA L. Frequent. K., especially plentiful round N. half of Serpentine.

S. NIGRUM L.

S. TUBEROSUM L. H., one under railings of The Dell, 1960; three on waste heaps by Marble Arch, 1961.

**DATURA STRAMONIUM L. H., one in soil at base of isolated tree near Bird Sanctuary, 1961, combining a purple corolla (f. TATULA (L.) Blytt) with spineless capsules (var. INERMIS (Jacq.)). These variants are due to a single dominant and a single recessive gene respectively (Avery, Satina & Rietsema, 1959).

**NICOTIANA TABACUM L. H., shrubbery by flyover, 1962. K., one on soil dump N. of Magazine, 1961.

**VERBASCUM PHLOMOIDES L. H., Hyde Park Corner area, 1960-62 (det. D. McCLINTOCK). K., several in border at E. side of Serpentine bridge, 1958.

**V. VIRGATUM Stokes. H., one among rubble below flyover, Hyde Park Corner, 1962 (det. D. McCLINTOCK).

**ANTIRRHINUM MAJUS L. H., singly in Hyde Park Corner area, 1960-62.

**LINARIA PURPUREA (L.) Mill. K., one in shrubbery at E. end of Serpentine bridge, 1961.

**KICKXIA SPURIA (L.) Dum. H., four on waste ground W. of Marble Arch, 1962.

**K. ELATINE (L.) Dum. K., several on soil patches, beside Temple Lodge and S.-E. of Speke Memorial, 1962.

*SCROPHULARIA AQUATICA L. H., one large plant in stone bowl outside North Lodge, 1960.

**MIMULUS MOSCHATUS Dougl. ex Lindl. K., weed in borders by Albert Memorial.

**DIGITALIS PURPUREA L. H., Bird Sanctuary; waste ground N. of Apsley House, 1961. Horticultural forms only.

**VERONICA SERPYLLIFOLIA L. H., one on waste ground by Marble Arch, 1962. K., patch on new soil strip S.-E. of Speke Memorial, 1962.

*V. ARVENSIS L. H., several in disused frames in the Nursery, 1961; one on bare ground by Marble Arch, 1962.

V. PERSICA Poir. H., K., eight records.

*V. POLITA Fr. H., one in shrub border by E. end of Serpentine bridge, 1961.

*V. AGRESTIS L. H., one in dahlia border W. of Marble Arch, 1958. K., one on path-side by N.-W. end of Serpentine, 1958.

**VERBENA × HYBRIDA Groenl. & Rumpl. H., occasional stray plants at Hyde Park Corner end.

**V. PATAGONICA Moldenke (*V. bonariensis* auct.). H., waste ground near Hyde Park Corner, 1961-62. K., weed in Long Walk border; several on soil dump N. of Magazine, 1961 (det. D. McCLINTOCK, as *V. bonariensis*).

**MENTHA ARVENSIS L. K., two in shrub border by Lancaster Gate, 1958; new soil strip S.-E. of Speke Memorial, 1962.

**M. SPICATA L. K., one in Magazine enclosure, 1958.

*LYCOPUS EUROPAEUS L. H., K., scattered around margins of Serpentine. H., one in long grass by bowling greens, 1958.

**SALVIA REFLEXA Hornem. H., patch under railings N.-W. of lido and on new traffic island by Dorchester Hotel, 1962 (det. D. McCLINTOCK).

*PRUNELLA VULGARIS L. H., K., eight stations, mainly in short turf in patches. Especially abundant in turf by Knightsbridge near Albert Gate.

**STACHYS ARVENSIS (L.) L. H., one beside temporary hut by Marble Arch, 1962.

S. SYLVATICA L. K., shrubbery N. of Temple Lodge, 1958; patch in Long Walk shrubbery N. of Hyde Park Gate.

**BALLOTA NIGRA subsp. FOETIDA Hayek. H., K., eleven records, mostly in the central part of both parks. Apparently increasing.

**LAMIUM AMPLEXICAULE L. H., five records, mostly singly. K., in various places between Lancaster and Victoria Gates since 1959.

*L. PURPUREUM L. Widespread since 1960.

**L. ALBUM L. H., Bird Sanctuary, 1960-62. K., several in border E. of Lancaster Gate, 1960-61.

**GALEOPSIS BIFIDA Boenn. H., new soil patch by Ranger's Lodge, 1958. K., shrub border by Lancaster Gate, 1958.

PLANTAGO MAJOR L.

**P. MEDIA L. K., two in turf on W. bank of Serpentine, 1959-61.

P. LANCEOLATA L.

**P. MARITIMA L. H., two in half-overgrown margin of gravel path beside bowling greens, 1959. New to v.c. 21.

*GALIUM VERUM L. K., one on path-side S.-E. of Palace, 1958; large patch in Orangery lawn.

G. APARINE L.

**SAMBUCUS NIGRA L. Not uncommon.

DIPSACUS FULLONUM L. subsp. FULLONUM. K., one in enclosure on E. bank of Serpentine, 1961 (also recorded here by both Kent and Warren); five on soil dump N. of Magazine, 1961-62.

**RUDBECKIA BICOLOR Nutt. K., soil dump N. of Magazine, 1961 (det. D. McCLINTOCK).

**HELIANTHUS ANNUUS L. H., one by subway by Marble Arch, 1962. K., one in pavement crevice by Fountains, 1961.

Galinsoga parviflora Cav. H., K., eight records, especially on S. side of parks.

G. ciliata (Raf.) Blake. H., K., rather more widespread than *G. parviflora*.

**Senecio jacobaea L. H., K., six records, all singly, on soil and in turf.

S. squalidus L.

**S. squalidus × vulgaris. H., one in lodge garden by Dorchester Hotel, 1960 (conf. D. H. Kent).

S. viscosus L. K., around Magazine enclosure. Four other records.

S. vulgaris L.

Tussilago farfara L.

[Pulicaria dysenterica (L.) Bernh. K., by railings almost opposite Albert Hall, 1961, too immature for certain determination. Probably correct, as since found in long grass in Green Park.]

*Gnaphalium uliginosum L. H., K., in various places in 1962 on newly-deposited soil.

**Aster novae-angliae L. K., by the Fountains, 1958.

**A. novi-belgii L. H., waste ground by Marble Arch and Hyde Park Corner, 1961.

Conyza canadensis (L.) Cronq.

Bellis perennis L.

**Anthemis arvensis L. K., one on disturbed patch N. of Magazine, and one on soil patch beside Temple Lodge, 1962.

[*Chamaemelum nobile (L.) All. K., several patches in lawn on S. side of Palace. Last reported there in 1871, when only one patch was noted. Doubtless originally planted, as also at Buckingham Palace, Hampton Court and Bushey Park].

Achillea millefolium L.

Tripleurospermum maritimum subsp. inodorum (L.) Hyland. ex Vaarama.

Matricaria recutita L. Very rare in Warren's time, now common.

M. matricarioides (Less.) Porter.

*Chrysanthemum leucanthemum L. H., three records, all singly. K., here and there in turf, especially on E. bank of Serpentine.

C. parthenium (L.) Bernh. H., Bird Sanctuary; border by Serpentine bridge. K., shrubberies by Black Lion Gate and on S. side of Palace.

Artemisia vulgaris L. H., one in shrubbery by Albert Gate, 1958; several on waste ground near Marble Arch, 1960-62. K., shrubbery near Fountains, 1959.

**Arctium nemorosum Lej. H., colony in Bird Sanctuary, in light shade.

A. minus Bernh. H., patches on both sides of Serpentine; enclosure by café. K., W. bank of Serpentine. Increasing.

**Carduus nutans L. K., one on soil dump N. of Magazine, 1961.

Cirsium vulgare (Savi) Ten.

C. arvense (L.) Scop.

**Centaurea nigra L. H., turf by Bird Sanctuary; one in grass by Grosvenor House, 1958. K., alongside Bayswater Road W. of Lancaster Gate; turf near Hyde Park Gate; edge of lawn on E. bank of Serpentine. Apparently increasing.

**C. NEMORALIS Jord. K., patch at N.-E. corner of Serpentine.

LAPSANA COMMUNIS L.

HYPOCHOERIS RADICATA L.

LEONTODON AUTUMNALIS L. H., two records. K., plentiful in lawn by Serpentine bridge; frequent along railings opposite Albert Hall.

**L. TARAXACOIDES (Vill.) Mérat. H., two on embankment E. of lido; one on waste ground by Marble Arch, 1962.

**PICRIS ECHIOIDES L. H., one 4 ft. tall on waste ground by Hyde Park Corner flyover, 1961; one in new-laid turf, Marble Arch, 1962.

TRAGOPOGON PRATENSIS subsp. MINOR (Mill.) Wahlenb. K., two patches in late-mown grass, at Alexandra Gate and by Queen's Gate Lodge.

LACTUCA SERRIOLA L. H., one on waste ground by Marble Arch, 1962. K., one by Lancaster Gate, 1960.

SONCHUS ARVENSIS L.

S. OLERACEUS L.

S. ASPER (L.) Hill. H., K., six records, always singly.

**HIERACIUM sp. K., patch by road between Palace Gate and Hyde Park Gate, 1958-59, mown before fully developed but "probably" H. LEPIDULUM (Stenstr.) Omang (det. P. D. SELL & C. WEST), which has also occurred in Buckingham Palace gardens.

**H. STRUMOSUM (W. R. Linton) A. Ley. H., patch at back of Bird Sanctuary, overlooking greenhouses (det. B. MILES).

**H. VAGUM Jord. H., one in long grass near Speakers' Corner, 1960 (det. P. D. SELL).

**CREPIS VESICARIA subsp. TARAXACIFOLIA (Thuill.) Thell. H., several on waste ground along E. edge of park, 1961-62.

*C. CAPILLARIS (L.) Wallr. H., K., five records, mainly singly.

TARAXACUM OFFICINALE Weber.

*T. LAEVIGATUM (Willd.) DC. H., patch in turf between Serpentine and Park Lane; near Police Station. K., frequent on path and in turf, Buck Hill.

POTAMOGETON PUSILLUS L. K., Round Pond (originally det. J. E. DANDY).

P. CRISPUS L. K., Round Pond.

ZANNICHELLIA PALUSTRIS L. K., Round Pond, abundant in 1958, reappearing sparingly in 1962.

**JUNCUS TENUIS Willd. K., over two dozen tufts in a fifty-yard stretch of turf between Round Pond and Lancaster Gate, since 1958; about four tufts in worn turf S. of Palace. In none of the other central parks, but recently found in Buckingham Palace gardens.

*J. BUFONIUS L. H., patch in shrub border by E. end of Serpentine bridge; one on waste ground by Marble Arch, 1962. K., one in shrub border by Lancaster Gate, 1958; several on new soil strip S.-E. of Speke Memorial, 1962.

*J. INFLEXUS L. H., one at edge of pavement next to Apsley House, within former boundary of park, 1962. K., planted in pools at the Fountains, whence occasionally self-sown nearby—doubtless the source of Kent's 1947 record.

J. EFFUSUS L. K., several in old turf N.-E. of Round Pond and S. of Palace; one among *Carex hirta* in front of Temple Lodge.

**J. CONGLOMERATUS L. K., one tuft among many *J. effusus* in moist turf between Round Pond and Lancaster Gate.

LUZULA CAMPESTRIS (L.) DC. K., patches among bluebells in late-mown grass, by Albert Memorial and W. of Queen's Gate.

[**CAREX ACUTIFORMIS Ehrh. K., several patches along N.-E. margin of Serpentine. Presumably planted. Also by Buckingham Palace lake.]

C. HIRTA L. H., K., patches in nine places, in turf or long grass or (by Park Lane) on waste ground. Apparently increasing.

**C. SPICATA Huds. H., Bird Sanctuary, 1962. K., six tufts beside Magazine enclosure, 1960-62.

*C. MURICATA L. H., nine tufts on traffic island N. of Apsley House, 1961-62 (conf. J. E. LOUSLEY).

C. OVALIS Gooden. Patches in old turf: H., between New Lodge and café. K., in six places E. and N.-E. of Round Pond. Apparently increasing.

[**GLYCERIA MAXIMA (Hartm.) Holmb. K., beside Serpentine on E. side by bridge (foliage only, conf. A. MELDERIS). Presumably planted, although there was a previous Serpentine record in 1813. Also by Buckingham Palace lake.]

*FESTUCA PRATENSIS Huds. H., K., locally abundant in turf in various places. Apparently much sown.

**F. ARUNDINACEA Schreb. H., colony in uncut grass by flyover; patches in turf, near Speakers' Corner, 1960, and at head of Serpentine; one on waste heaps near Marble Arch, 1961.

*F. RUBRA L. H., K., frequent in dry turf.

**F. TENUIFOLIA Sibth. K., turf about Round Pond (det. J. E. LOUSLEY), misreported as *F. ovina L.* in Kent (1960). Warren reported *F. ovina*, doubtless in an aggregate sense, which may well have been this.

LOLIUM PERENNE L.

L. MULTIFLORUM Lam. H., one by Ranger's Lodge, 1958; one by Park Lane railings, 1960. Greatly decreased.

**L. RIGIDUM Gaud. H., new traffic island by Dorchester Hotel, 1962 (det. D. MCCLINTOCK).

*VULPIA BROMOIDES (L.) Gray. H., one on path-edge near bandstand, 1961.

POA ANNUA L.

P. NEMORALIS L. H., K., singly on soil dumps and in shady borders; in 1961 in quantity along edge of shrubbery at E. end of Long Walk, clearly sown.

P. PRATENSIS L. Locally abundant in late-mown areas.

P. TRIVIALIS L. Widespread and locally abundant.

**P. PALUSTRIS L. H., several on waste heaps by Marble Arch, 1961 (conf. J. E. LOUSLEY and A. MELDERIS). By head of Serpentine, 1962 (LADY A. BREWIS, conf. J. E. LOUSLEY).

DACTYLIS GLOMERATA L.

CYNOSURUS CRISTATUS L.

BROMUS STERILIS L. K., two patches under boundary railings N. of Palace; two on site of new lodge, Orme Gate, 1962. Greatly decreased.

B. MOLLIS L. K., one by road near Queen's Gate, 1959; patch on path by Magazine, 1960. In Warren's time this was thinly but generally distributed in the turf. Greatly decreased even since 1949.

AGROPYRON REPENS (L.) Beauv.

**A. DESERTORUM (Fisch.) Schult. H., patch on traffic island N. of Apsley House, 1962 (det. A. MELDERIS). New to British list.

**TRITICUM AESTIVUM L. H., singly or in patches, near Marble Arch and Hyde Park Corner, 1961-62.

SECALE CEREALE L. H., one on rubble at E. end of Rotten Row, 1962 (det. D. H. KENT).

HORDEUM SECALINUM Schreb. H., K., persistent on various verges, where it was widely sown after the 1959 drought.

H. MURINUM L. Now only occasional.

**H. DISTICHON L. H., one in shrubbery by Albert Gate, 1961 (det. A. MELDERIS); waste ground by Speakers' Corner, with *Triticum aestivum,* 1962.

*TRISETUM FLAVESCENS (L.) Beauv. H., K., locally abundant in turf, especially S. and W. of Fountains.

AVENA SATIVA L. H., several with *Triticum aestivum* by Speakers' Corner, 1962.

ARRHENATHERUM ELATIUS (L.) Beauv. ex J. & C. Presl. K., patch in border E. of Lancaster Gate, 1960.

HOLCUS LANATUS L. H., K., five records.

*H. MOLLIS L. K., turf between Physical Energy and Bayswater Road, in several places and locally abundant; plentiful under boundary railings N. of Palace.

*DESCHAMPSIA FLEXUOSA (L.) Trin. K., old turf S.-W. of Lancaster Gate (very poorly developed due to constant trampling, conf. A. MELDERIS).

AGROSTIS TENUIS Sibth.

A. GIGANTEA Roth. H., K., three records.

*A. STOLONIFERA L. var. STOLONIFERA. Frequent.

**var. PALUSTRIS (Huds.) Farw. K., margin of Serpentine on E. side near bridge (conf. A. MELDERIS).

*APERA SPICA-VENTI (L.) Beauv. H., several in shrubbery by bandstand, 1961.

PHLEUM BERTOLONII DC. H., K., frequent in turf, especially on verges. Not recorded by Warren.

**P. PRATENSE L. H., K., five records, including on dumps and resown verges.

*ALOPECURUS MYOSUROIDES Huds. H., one on rubble at E. end of Rotten Row, 1961; one on soil dump near Marble Arch, 1962.

A. PRATENSIS L.

**A. GENICULATUS L. K., abundant in marshy turf midway between Physical Energy and Fountains since 1959, when apparently brought in with soil; new-laid soil S. of Palace, 1959.

*ANTHOXANTHUM ODORATUM L. H., K., four places in turf, also twice on soil dumps.

**PHALARIS CANARIENSIS L. H., K., six records, including continuously, 1958-61, in shrub border at S.-E. end of Serpentine bridge.

**SETARIA VIRIDIS (L.) Beauv. H., patch on new traffic island by Dorchester Hotel, 1962.

**S. ITALICA (L.) Beauv. H., opposite Dorchester Hotel, 1962.

**Panicum mileaceum L. H., singly on disturbed ground by Dorchester Hotel, 1959, 1962; patch near Marble Arch, 1960. K., one among paving stones by Fountains, 1961.

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SOME STUDIES IN CALYSTEGIA. 2: OBSERVATIONS ON THE FLORAL BIOLOGY OF THE BRITISH INLAND TAXA

By Clive A. Stace

1. Introduction

There are two white-flowered species of *Calystegia* in Britain (*C. sepium* (L.) R.Br. and *C. silvatica* (Kit.) Griseb.) and, in parts of southern England at least, hybrids between them are frequent (Stace, 1961). In addition a number of pink-flowered or partly pink-flowered taxa exist, some only slightly different from the above two species and hybrid, others apparently distinct (cf. Brummitt & Heywood, 1960), but there is good evidence that all the taxa in this complex are capable of hybridization. The following comments apply to all these taxa in general, except where otherwise noted, being based on fairly extensive observations in the years 1958-64. None of the general comments should be taken as necessarily applying to *C. soldanella* (L.) R.Br.

The major factors prompting this survey were the numerous conflicting and erroneous reports in the literature, and the need to point out the fields in which further observations and experiments are required.

2. Flower Morphology and Colour

The flowers are borne usually singly at each node on somewhat flexuous pedicels 2-21 cm. long, although late in the season a second flower may develop in the same leaf axil as an already fertilized flower (possibly '*C. sepium* var. *biflora* Choisy' belongs here), and more rarely various abnormalities with branching pedicels occur. The two bracteoles and five sepals appear to have no biological significance when the flowers are open, although they presumably protect the developing fruit.

The corollae vary from 2·5 to 8·5 cm. long, and are scarcely or not at all lobed at the apex, except in plants such as *C. sepium* f. *schizoflora* (Druce) Stace* which correspond to the abnormalities found with the corolla divided into five lobes for most of its length. The corollae may be cone-shaped or variously trumpet-shaped with the margin rolled outwards, and c. 2-9 cm. diameter at the apex. In bud the corollae are longitudinally fluted, with the junctions of the five corolla elements grooved into the flower centre. The centre of each corolla element is thicker and more fleshy than the margins, and due to the fluting these five bands are the only parts of the unopened corolla adjacent to the exterior. In addition the corolla is twisted slightly to the left (i.e. clockwise when viewed from the apex) when in bud, which is the opposite direction to the twining of the stems. The corolla is glabrous.

Calystegia sepium* (L.) R.Br. f. *schizoflora* (Druce) Stace, comb. et stat. nov. (based on *Volvulus sepium* Junger var. *schizoflorus* Druce). Rep. Bot. Soc. & E.C., **6 : 297 (1922)).

The five stamens alternate with the central bands of the corolla elements, and are firmly attached to the base of the corolla tube. They are 15-31 (41) mm. long, with rather firmly basifixed anthers 4·5-9·0 mm. long. The filaments are stout and held stiffly erect against the central style. In their lower half they are considerably thickened and rather densely coated with stalked glands which vary in abundance and stalk-length and in the proportion of each filament they cover. The anthers, which are only bilocular, open by two latero-extrorse longitudinal slits, and little pollen seems to find its way of its own accord on to the stigma, most of it in undisturbed flowers falling on to the inside of the corolla. The anthers form a more or less complete ring around the style. The pollen is spherical, 65-95μ in diameter, unfurrowed and polyporate.

The short more or less conical, very obscurely four-lobed ovary is topped by a slender, straight, glabrous style c. 11-31 mm. long. The stigma is very deeply divided into two, thick, fleshy, verrucose lobes c. 2·0-3·5 mm. long. The stigma usually exceeds the anthers to some extent, sometimes by as much as 7 mm., but in other cases not at all, so that the anthers and stigma may or may not overlap.

On the receptacle, between the insertion of the stamens and the ovary base, is situated the disc-like nectary, which is composed of five deep yellow, rather ill-defined lobes alternating with the stamens. The broadened bases of the filaments meet at their margins, but are only adfixed to the corolla tube at their mid-lines so that a gap up to c. 1 mm. diameter exists between adjacent points of filament insertion, and the five nectary lobes secrete nectar through these five apertures.

Corolla colour is of interest since there has been considerable inaccurate or inadequate description of it by some authors. In 'white-flowered' plants the broad thin margins of each corolla element are pure white, but the thicker central band of each is usually cream-coloured externally. This cream colour may be absent to very pronounced. In other cases the central band is purplish-pink, frequently very deeply and conspicuously so, though the colour very rarely reaches the inner side of the corolla. The latter forms in *C. silvatica* have been named var. *zonata* Beauverd, and are frequent in Britain.

The presence of pink colouration on the other parts of the corolla gives rise to 'pink' or 'pink-striped' flowers, although the latter term is often used to describe *zonata* forms as well. In the truly pink-flowered types the pink coloration extends equally to the internal surface of the corolla, and since this character is very rarely accompanied by the *zonata* characteristic the pink corolla is usually striped internally and externally with five narrow white or cream rays which correspond to the central band of each corolla element.

Apart from these whitish longitudinal central bands and the translucent marginal lines of the corolla elements the corolla is unmarked in its interior, being uniformly white to rose-pink. The androecium and gynoecium are both white or whitish cream, except that in pink-flowered plants the distal, glandless part of the filaments may be also coloured pink.

3. Fungal Infection

The rather rare smut *Thecaphora seminis-convolvuli* (Duby) Lirio (*T. hyalina* Fingerh., *T. capsularum* Desm.) is the only parasitic fungus recorded on *Calystegia* flowers. Ainsworth & Sampson (1950) give the hosts as *C. sepium, C. soldanella* and *Convolvulus arvensis,* and record it from Norfolk, Wiltshire and Devon. D. H. Dalby kindly gave me examples of the disease on *C. silvatica* collected in Surrey in 1961. The brown powdery spores are found in late summer filling the seeds occupying capsules at first of normal external appearance, but the spores later become evident due to the breakdown of the testae and pericarp. The 'conidial' stage of this smut, which appears to be the fungus known as *Gloeosporium antherarum* Oud., infects the anthers of open flowers. Such flowers are said to be smaller than normal, with white to dirty-yellow or dirty-brown often degenerate anthers which are sessile or shortly filamented (Knuth, 1906; Ainsworth & Sampson, 1950).

Reference is also made in the literature (vide Knuth, 1906) to flowers of *C. sepium* with various numbers of abortive anthers apparently unconnected with any fungal attack. In *Convolvulus arvensis* a whole range of forms from normal to completely female have been recorded, authors being in disagreement as to whether or not the cause is fungal or genetic. Bisexual and female forms of *Calystegia soldanella* have also been found, in this case both sorts producing good seed so that *Thecaphora* would appear not to be involved. Obviously more observations are needed in this field, but abnormal small-stamened forms of inland *Calystegia* have not been observed by the writer.

4. Flower Opening

There is disagreement in the literature as to the times of flower opening and closing in *Calystegia,* mainly with regard to their behaviour during wet weather and at night. Observation showed a single, though plastic, time-sequence to operate.

The flowers of a branch open in acropetal succession, only exceptionally more than one node per branch bearing an open flower on the same day. This sequence is often very regular, the successive nodes of a branch frequently bearing open flowers on consecutive days, and this fact is useful in carrying out emasculations for pollination experiments. The flowers open soon after sunrise, whatever the weather, and remain open for the rest of the day. Anther dehiscence occurs very soon after the corollae open. Despite claims to the contrary by several authors the corollae never close because of wet or dull weather, and indeed never re-open once they do close. In heavy rain the wide open flowers usually become bent over on their flexible pedicels, thus affording some protection to the inner organs, as noted by Hansgirg (Knuth, 1906). However, in plants with short pedicels, in heavy rain the corollae often become filled with water and shredded into shapes resembling f. *schizoflora*. Thus, apart from the mechanical effects of heavy rain, the flowers remain open for pollination throughout the day.

The time of flower closure varies according to conditions, but the numerous comments in the literature that flowers open or close at night in various conditions are quite misleading. Following a sunny day which has resulted in successful pollination some of the flowers of a colony may begin to close about or just before dusk, but many remain open well into the night or until the next day. The nature of the night (moonlit or dark, warm or cold, wet or dry) was observed to have no effect on this. In most cases all the flowers have closed by early on the second day, about 24-28 hours after opening. Wilcke (1954) found that in his area of observation all the flowers had already closed by the first nightfall. Sometimes, however, the flowers tend to remain open rather longer than 24 hours, this being especially noticeable after dull or wet days or during cold weather, and such an extension of the life of the flower is much commoner in *C. sepium* than in *C. silvatica*. In these cases the flowers may remain open well into the second day or evening, or some may not close until the following morning, at least 48 hours after opening. It appears that flowers never close at night and re-open the next day. In warm sunny weather, flowers tied with cotton on one evening so as to prevent them opening the next day, and released early the following morning (i.e. one day late), remain open for a very few hours only, although they may become effectively pollinated during this time. On sunny days all pollen is removed from the anthers by the middle of the first morning, although the stigma may remain receptive for over 24 hours longer and in bad weather the anthers often contain pollen for a similar length of time. The flowering period of *Calystegia* in Britain extends from June to September or, in southern England at least, sometimes considerably later.

5. Pollinators and Pollination

(a) *Attraction*

The flowers of *Calystegia* are amongst the largest in the British flora, and extremely conspicuous from a considerable distance. The corollae are also particularly conspicuous at dusk or on moonlit nights, which has probably led to the widespread belief that *Calystegia* has 'diurnal hawkmoth flowers'. All the relevant authors (Müller, 1883; Knuth, 1906; Hegi, 1927; Hutchinson, 1945; Tutin, 1952 and 1962) state that the flowers are scentless, but, although scent is a matter of personal perception, this is not true in the writer's estimation since he can detect a faint yet very distinctive odour in all the taxa. That this is significant is shown by Free & Butler's (1959) statement that bumble-bees have been shown to readily recognise the scent of various flowers that most humans cannot smell. *Calystegia* undoubtedly possesses a scent discernible to insects, although it obviously does not fall into the category of the strongly-scented 'hawkmoth flowers' such as *Lonicera* and *Nicotiana*.

Observations on the behaviour of bumble-bees indicated that attraction to open flowers of *Calystegia* takes place in three phases, the first initiated by the conspicuous pale corollae. Bumble-bees were readily attracted to any pale object upon a *Calystegia* colony (e.g. a flower, a handkerchief or a paper bag), only veering away at the last moment from all but open flowers. Thus the second phase appears to be attraction by the shape of the corolla. In almost all cases, however, only flowers with nectar and pollen were actually entered by the bees, so the third stage, the selection of suitable flowers, may well be carried out by scent perception. Flowers which have lost their nectar and pollen possess much less odour than newly-opened flowers, although not all the scent emanates directly from these sources. The above conclusions are supported by the data of Free & Butler (1959), who state that colour is important in the attraction of bumble-bees, and that the latter are more attracted to large or cone-shaped flowers than to small or flat flowers.

(b) *Insect Visitors*

There are comments in the literature (e.g. Müller, 1883; Knuth, 1906) that *Calystegia* flowers are little frequented by insects, and compared with flowers of a similar conspicuousness this seems to be true for many localities and for much of the year. At times, however, insect visitors are abundant, and many species have been recorded. The following list is by no means exhaustive but indicates the range of species of insect visitors encountered.

LEPIDOPTERA: *Herse convolvuli* (in Knuth, 1906); *Lycaena phlaeas, Nymphalis io* and *Gonepteryx rhamni* (Pocock, 1957); *Ochlodes venata* and *Emmelina monodactylus* (larva) (Stace); *Anthophila fabriciana* (Uffen, 1962).

HYMENOPTERA (APIDAE): *Bombus agrorum, B. terrester* and *B. hypnorum* (in Knuth; Stace); *Apis mellifica* (Baker, 1957; Stace); various species of *Systropha, Chelostoma, Halictus, Megachile, Stelis, Eucera* (Müller, 1883: in Knuth).

HYMENOPTERA (FORMICIDAE): *Myrmica rubra* (Felton, 1959).

HYMENOPTERA (VESPIDAE): *Vespa rufa* (in Knuth).

DIPTERA: *Epistrophe, Rhingia, Eristalis, Syrphus, Helophilus, Empis, Calliphora, Sarcophaga, Lucilia* and *Anthomyia* spp. (in Knuth; Baker, 1957; Wilcke, 1954), of which the first five are hoverflies (Syrphidae).

COLEOPTERA: *Meligethes* sp. (Müller); *M. viridescens* and *Psylliodes attenuatus* (Stace).

HEMIPTERA (HETEROPTERA): *Anthocoris nemorum* (Stace).

DERMAPTERA: *Forficula auricularia* (in Knuth; Stace).

THYSANOPTERA: Thrips (Müller; Stace) abundant.

COLLEMBOLA: "minute Podurae" (Müller) probably refers to members of the Poduridae.

Few of the above are significant in pollination, and many are purely chance associations. The insects are thus more usefully classified by the nature of their visit:

1. Chance Association or Protection: Numerous species of small insects. Many species of the next three groups also take cover in the flowers at night or during rain.
2. Scavengers, Predators and Flower-Eaters: Thrips are abundant flower-pests which feed on plant sap. The beetles and earwigs appear partial to pollen and sometimes to nectar, often devouring the whole anther or even other parts of the flower. The bug is a predator. Ants have been seen attempting to obtain the nectar of *Convolvulus arvensis,* and probably do likewise in *Calystegia*. Some of the flies and other small insects are scavengers. In addition to a number of moth larvae which regularly feed on the foliage of *Calystegia* species larvae of *Emmelina monodactylus* have been seen devouring the stamens and corolla.
3. Pollen or Pollen/Nectar Feeders: The hoverflies and some of the smaller bees (and the wasp?). These do not devour any of the flower parts.
4. Long-tongued Nectar Imbibers: The lepidoptera imagines and the bees, especially the bumble-bees (*Bombus* spp.).

(c) *Method of Pollination*

There is little structural mechanism for preventing self-pollination. The flowers are homogamous (i.e. anthers and stigma maturing together), and, although most of the pollen falls on to the corolla due to the partially extrorse dehiscence of the anthers, some nearly always finds its way on to the stigma (except where the latter clears the anthers by several mm.) and the visits of the hoverflies, bees and lepidoptera often effect self-pollination (autogamy). Knuth (1906) points out that autogamy also occurs by the fall of the corolla, when the anthers are dragged over the stigma, although this often removes the stigma as well. It has been shown by several workers, however, that the British inland *Calystegia* taxa are completely (or at least very highly) self-sterile (Stace, 1961).

The main, and in fact only important, pollinators of *Calystegia* are bees of the genus *Bombus,* especially *B. agrorum* (Common Carder Bee). They are the only really frequent nectar-seeking visitors, and their large hairy abdomen is frequently seen self- and cross-pollinating. *Apis,* the Honey-Bee, is less effective because of its less frequent visits and smaller, less hairy body. The pollen-devouring hoverflies usually cause rather little disturbance of the pollen, and seem to take very little of it away on their legs. They frequently do not touch the stigma. The lepidoptera, like the hoverflies and smaller bees, are to be regarded as pollinators of secondary importance, in this case due to the scarcity of their visits. In very many hours of work the writer has seen only one such visit: that of a Large Skipper Butterfly to *C. silvatica.* Uffen (1962) stated that the small moth *Anthophila fabriciana* visits the flowers of *Calystegia* in sunshine, but that the latter "do not seem to be very attractive to moths after dark".

Calystegia has traditionally been regarded as a hawkmoth flower pollinated primarily by *Herse convolvuli* (Convolvulus Hawkmoth), but this must be an error. This moth, of course, is named after the foodplant of the larva (all European *Calystegia* species and *Convolvulus arvensis*), as with other hawkmoths, and not after the habit of the imago. White (1873) suggested that the distribution of *Calystegia* in Britain was partly determined by that of *H. convolvuli,* since where the latter was rare (e.g. Scotland) so was *Calystegia,* and in England both were commoner. However, even there the moth was not common, and this could be connected with the fact stated by some authors that *Calystegia* seldom set seed in Britain. Cory (in Müller, 1883) added to the story by stating that *C. sepium* was commoner in Northern Ireland than *Convolvulus arvensis,* and that *H. convolvuli* was there comparatively frequent. White, however, never saw *H. convolvuli* at *Calystegia* flowers, and there do not appear to be any records of this phenomenon in Britain. Even Continental records are scarce. H. Müller never saw them, although several of his pupils are said to have done so. Delpino had a friend who claimed to catch *H. convolvuli* by waiting until they entered *Calystegia* and then pinching the corolla together (Müller, 1883). That this can be entirely discredited is shown by the facts that *H. convolvuli* does not 'enter' flowers, and that this is in any case a physical impossibility for such a large moth. Knuth (1906) gives two other recorders of the visitation of *H. convolvuli* to *Calystegia* flowers (himself and Alfken) but nothing is known of their observations. Like other large hawkmoths *H. convolvuli* in this country usually visits the flowers of such plants as *Petunia, Lonicera, Nicotiana, Pelargonium,* etc., imbibing nectar by means of its several inches long tongue whilst hovering in front of the flower. The other lepidoptera observed visiting *Calystegia,* and the bees, need to alight on the flowers because of their shorter tongues, e.g. *Gonepteryx rhamni* 18 mm., *Nymphalis io* 15-16 mm., *Bombus agrorum* 10-15 mm. and *Apis mellifica* 6-7 mm. (Christy, 1922).

H. convolvuli is a migrant visitor to this country, and only rarely have larvae been found. The moth has always been rare in Britain, although numbers fluctuate from year to year. According to South (1939) the moth was about as common at the end of the last century as it is now. For example there were well over 100 recorded in 1895, a peak year, very few indeed in 1896, and about 40 in 1897. According to figures collated by R. A. French for the Insect Immigration Committee of the South-Eastern Union of Scientific Societies the average number of *H. convolvuli* recorded annually for the years 1930-1962 is 86, numbers over the last ten years (1953-62) being 55, 7, 36, 155, 4, 42, 83, 161, 42 and 30. Although this must represent but a small proportion of the actual numbers of immigrants, insects which are at all common are recorded in much higher numbers, e.g. *Vanessa atalanta* in thousands, *Plusia gamma* in tens of thousands, so that *H. convolvuli* is undoubtedly a rare moth. That it could play a significant part in the pollination of such a common plant as *Calystegia,* even if it were particularly attracted to that genus (which it is not), is out of the question. Moreover, *H. convolvuli* flies from dusk until "well on into the night" (South, 1939), when *Calystegia* flowers will normally have shed all their pollen whether or not they remain open.

It is thus concluded that the most important pollinators of *Calystegia* are species of *Bombus,* particularly *B. agrorum.* Knuth (1906) also noted that *B. agrorum* played a considerable part in pollination, but Wilcke (1954) and Baker (1957) appear to have been the first to refute the *H. convolvuli* hypothesis. *B. agrorum* is very common throughout most of the British Isles from spring well into September (Yarrow, in Free & Butler, 1959), and in south-east England a common sight is dozens of this species frequenting a colony of *Calystegia* and effecting pollination. The whole flower is severely shaken by the visit of a *Bombus,* which often becomes thickly dusted with pollen, but there appear to be no special adaptations to cross-pollination by bees apart from the presence of nectaries and semi-extrorse anthers. Mixed pollination is thus the rule, cross-fertilization being ensured by the self-incompatibility mechanism.

6. DISCUSSION

Calystegia flowers are large, conspicuous, faintly scented, nectar-secreting, homogamous, self-incompatible, have latero-extrorsely dehiscing anthers and are pollinated in the main by bumble-bees. The chances of seed-set would thus seem to be good in areas where the plant is common.

In south-east England very good seed-set has been observed in the years 1958-1964, and Baker (1957) noted the same in 1956, although he found that smaller colonies, presumably uniclonal, often remained barren, whilst the larger colonies produced abundant seed. This tendency is, of course, to be expected in a self-incompatible species where genetic heterogeneity is essential for successful fertilization. In the presence of abundant insect pollinators, however, the effect will be less marked because the greater the number of pollen vectors the greater are the chances of pollination by compatible pollen from distant colonies. Urban areas and seasons with poor weather are thus more likely to show up a difference between the fertility of uniclonal and multiclonal colonies. In the Weald, in fact, during the past seven years counts to determine the ratio of numbers of actual to possible seeds produced showed no differences between homogeneous and heterogeneous colonies (Stace, 1961).

Although it is often claimed that *C. sepium,* the only native species here considered, becomes much scarcer in northern Britain, and that there *C. silvatica* is the commoner plant, a perusal of the *Atlas of the British Flora* (Perring & Walters, 1962) shows that this is not wholly so. In Scotland *C. sepium* is the commoner species, and it extends further north than *C. silvatica,* although many of the northern colonies of *C. sepium* may be introduced, as are all those of *C. silvatica* in Britain. When comparing the populations of the Liverpool-Manchester vicinity with those of the Kent and Sussex Weald, *C. sepium* is found to be relatively much less common in the former area, but this is no less true of the large industrial areas of the south, such as Greater London. In other words *C. sepium* and *C. silvatica* become scarcer northwards to about the same degree, but in urban areas *C. silvatica* tends to become the commoner species. Baker (1957) suggested that the cause for the northward decline of *C. sepium* was climatic, but, although this is probably at least partly true, the scarcity of suitable natural habitats (non-acid fens, marshes, ditches, etc.) may have originally been as important. *C. silvatica* is a Mediterranean species and it would indeed be surprising if it were more tolerant than *C. sepium* of northern climates.

Available evidence suggests that there is some gene exchange between *C. sepium* and *C. silvatica* (Stace, 1961), but even so it seems that due to the definitely sparser population of *Calystegia* in northern Britain colonies there less frequently set abundant seed. Seed-set in Lancashire and Cheshire during 1962-64, for example, has been sparser than in south-east England during that period. It is quite possible, of course, that the climate has a direct as well as an indirect effect upon seed production. Hybrid populations also seem to be proportionately less common in north Britain.

It might be inferred from work done in south-east England (Stace, 1961) that the self-incompatibility system of *Calystegia* carries many S-alleles, since a high proportion of inter-colony crosses proved successful. However a great deal more work is needed on controlled crosses between as many colonies as possible in order to determine the exact degree of intraspecific crossability of both *C. sepium* and *C. silvatica,* and to discover the relationships between the incompatibility alleles of the two species. The high level of fertility of *C. silvatica* suggests that it has been introduced into this country from a number of different sources.

The pink-flowered taxon known usually as *C. pulchra* Brummitt & Heywood (1960) is reported as being a very poor seeder in this country (Walters & Webb, 1956), and observation by the writer in south-east and north-west England confirms this, even in areas where the other two species are abundant. Since *C. pulchra* is never very common in an area this would tend to suggest that it is rarely fertilized by *C. sepium* or *C. silvatica*. There is, of course, the possibility that pollinating insects tend to keep to either pink- or white-flowered plants, but the writer has observed individual bees freely visiting the flowers of both types in mixed colonies in which the pink-flowered taxon produced not one seed yet the white-flowered taxon became abundantly fertile. A further possibility is that mentioned by Baker (1957): that *C. pulchra* might owe its partial sterility to ancestral hybridity. Such an origin is quite likely as *C. pulchra* is unknown as a native species. That *C. sepium-silvatica* hybrids show little evidence of such sterility at least in F_1 generations is of little significance, and the writer has recently discovered in south-east England a number of colonies almost certainly of this parentage which show a very low level of fertility. Clearly there is room for a great deal more work in these fields, although this is hampered by the difficulty of obtaining large numbers of clones of such a rampant perennial as *Calystegia* in cultivation together.

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VIOLA STAGNINA IN OXFORDSHIRE

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In Britain, *Viola stagnina* has two main areas of distribution: eastern England where it occurs in fens, and western Ireland where it is a plant mainly of damp hollows and the margins of temporary lakes. In Eurasia it has a Continental distribution, and the eastern English range fits with this. The western Irish distribution is anomalous, but there are several "Continental" species found in western Ireland, so it is not unique in this respect.

The Oxford region has a mildly Continental climate, and the presence of *Viola stagnina* in the region is not surprising. What is perhaps surprising is its rarity in the area, and the purpose of this paper is to discuss its two Oxfordshire localities and to compare them with the others. These localities have both been known for a long time, but during the last fifty years there have been no records of their continued existence. They are at Menmarsh, just near the Oxon-Bucks. border, and on Otmoor. In the course of an investigation into hybridization between this species and *V. canina,* a search was made for both these populations.

OTMOOR

The Otmoor locality of *Viola stagnina* has never been clearly established, and the only previous record of it was based on a herbarium specimen in the Oxford Herbarium. This is labelled in such a way as to suggest that the specimens were grown in the Botanic Garden, from seed collected on Otmoor. A comparison of the handwriting on the labels with that of John Baxter, who was curator of the Botanic Garden at the time the plant was collected, in 1821, suggests that he was probably responsible for the specimen.

Druce stated that he had carefully searched Otmoor on several occasions and had been unable to find *Viola stagnina* there. However, for some years a population of violets has been known, which consists of *V. canina* and its hybrid with *V. stagnina,* indicating that *Viola stagnina* had been present in the vicinity, even if it is now extinct there.

Viola stagnina could not be found near this hybrid population. However, in 1963 I was sent a violet collected on Otmoor by J. D. Bates, and it appeared to be *V. stagnina.* This proved to be so in 1964 when Dr. E. F. Warburg and I refound it. The population consists of a fair number of vigorous plants, growing among tall grasses in the lower end of a hay meadow. A list of associated species is given in Table I. In some adjacent meadows *V. canina* and some hybrids were found.

MENMARSH

Viola stagnina was found at Menmarsh in 1914 by P. M. Hall. Judging from the number of specimens in the herbaria at Oxford, the British Museum and Edinburgh, the population was quite extensive then. Druce (1927) mentioned that the area was very wet and difficult of access in all but the driest seasons. He saw it in 1914 during a prolonged drought, but could not refind it in two subsequent years.

So far as I know it was not seen again at Menmarsh until 1956, when R. C. Palmer reported having seen it there. In 1963 L. A. Boorman and I searched the area thoroughly, and finally traced a very small population, only eight stunted plants being seen in flower in 1963, and three in 1964. On slightly higher ground nearby there are a few hybrids and some plants of *V. canina.* Much drainage has been carried out since 1914 and though the area is flooded in winter it is quite dry by the time the violets flower. *Viola stagnina* is in a precarious state here.

THE POPULATIONS COMPARED

From data so far obtained, *Viola stagnina,* in its other localities in the British Isles, is a plant of places that are very wet for at least part of the year, and where the vegetation is maintained in a somewhat open condition. In fact, it is now extinct in many of its former localities as the result of drainage. It is intolerant of shading, and its recent resurgence at Woodwalton Fen after clearance of scrub by the Conservation Corps indicates that it is capable of persisting as seed or plants for some time, until conditions are suitable. The Irish localities are typically round the edges of ephemeral lakes, where it is flooded in winter and in wet spells at other times of the year, and which remain clear of shrubs. Praeger (1932) records that it occupies the lowest zones round these turloughs, being followed by hybrids with *V. canina* and then by *V. canina* itself.

The two Oxfordshire localities are strikingly different from each other, and this may be the result of more effective drainage at Menmarsh. Unfortunately, Druce made no record of any of the associated species there, so we cannot tell how the difference in the water levels has been followed by changes in the vegetation. Now the water regime resembles that in the turloughs of western Ireland. In winter the water level of the small artificial pond nearby rises and the *Viola stagnina* is inundated. It occupies the lowest part of the area with hybrids and *V. canina* on higher ground, paralleling the situation in the turloughs.

This field was ploughed about twenty years ago, and one would like to know the changes caused by this treatment. *V. stagnina* would probably be unharmed since it reproduces by soboles, and would rapidly regenerate. The disturbance might even have been of some benefit. The grazing which has taken place since has suppressed scrub growth and no doubt helped to maintain the violets. The area has now been fenced by the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust, and controlled grazing will be carried out.

Table I

Viola stagnina in Oxfordshire and Huntingdonshire—Associated species

Site Key

1-4 Woodwalton Fen, Hunts. Area cleared by Conservation Corps within last three years.
5-6 Otmoor, *Viola stagnina* locality in wet meadow. 1964.
7 Menmarsh. 1963.
8 Otmoor, field with hybrids between *Viola stagnina* and *V. canina.*

Sample areas 4 sq. m. in each case.

All samples assessed on Domin cover-abundance scale (as modified by Poore, 1955).

	Site							
	1	2	3	4	5	6	7	8
Achillea ptarmica	—	—	—	—	3	1	—	—
Ajuga reptans	—	—	—	—	—	—	1	—
Alopecurus pratensis	—	—	—	—	—	1	—	3
Anthoxanthum odoratum	—	—	—	—	—	—	5	5
Betula pubescens	—	—	3	2	—	—	—	—
Briza media	—	—	—	—	—	—	—	2
Calamagrostis epigejos	9	6	9	9	—	—	—	—
Cardamine pratensis	—	—	—	—	—	3	3	1
Carex filiformis	—	—	—	—	—	—	—	1
C. flacca	—	—	—	—	—	—	4	—
C. hostiana	—	—	—	—	—	—	2	—
C. nigra	—	—	—	—	2	—	—	—
C. ovalis	—	—	—	—	2	2	—	—
C. pallescens	—	—	—	—	—	—	3	—
C. panicea	—	—	—	1	3	—	4	—
C. riparia	—	—	1	—	—	—	1	—
Centaurea nigra	—	—	—	—	3	—	—	—
Cirsium dissectum	—	—	—	—	2	—	5	4
C. palustre	—	—	—	2	—	—	—	—
C. vulgare	—	—	—	—	—	—	2	—
Clinopodium vulgare	—	—	—	—	3	—	—	—
Convolvulus arvensis	—	2	1	2	—	—	—	—
Crataegus monogyna	—	—	—	1	—	—	—	—
Deschampsia cespitosa	—	—	—	—	6	3	—	—
Festuca arundinacea	—	—	—	—	3	—	—	—
F. pratensis	—	—	—	—	—	—	—	3
F. rubra	—	—	—	—	—	5	—	5
Filipendula ulmaria	4	6	4	4	5	6	—	1
Galium palustre	—	4	2	1	3	5	—	—

	Site							
	1	2	3	4	5	6	7	8
Holcus lanatus	—	—	—	—	—	—	—	2
H. mollis	—	—	—	—	—	—	3	—
Hydrocotyle vulgaris	3	—	—	3	—	—	—	—
Iris pseudacorus	—	—	—	3	—	—	—	—
Juncus conglomeratus	—	—	—	—	3	3	3	2
Lotus corniculatus	—	—	—	—	—	—	—	1
L. uliginosus	—	—	—	—	2	—	—	—
Lychnis flos-cuculi	—	2	2	—	1	—	—	—
Lysimachia nummularia	—	—	—	—	1	—	1	—
Lythrum salicaria	—	—	—	—	1	—	—	—
Phalaris arundinacea	—	—	—	—	2	4	—	—
Phragmites communis	1	—	—	1	4	—	—	—
Poa trivialis	—	—	—	—	2	5	2	—
Potentilla erecta	—	—	—	—	—	—	2	1
Prunella vulgaris	—	—	—	—	—	—	3	—
Ranunculus acris	—	—	—	—	—	—	2	—
R. repens	—	—	—	—	4	3	—	1
Salix cinerea subsp. oleifolia (subsp. *atrocinerea*)	—	—	2	—	1	—	—	—
S. repens	6	—	—	3	—	—	—	—
Sanguisorba officinalis	—	—	—	—	—	—	—	3
Silaum silaus	—	—	—	—	1	2	—	1
Stachys palustris	—	—	—	1	—	—	—	—
Succisa pratensis	—	—	—	—	—	—	—	2
Symphytum officinale	2	—	1	1	—	—	—	—
Thalictrum flavum	—	2	2	—	2	2	—	—
Trifolium repens	—	—	—	—	—	1	—	—
Vicia cracca	2	—	1	1	3	4	—	2
Viola canina × stagnina	—	—	—	—	—	—	—	6
V. stagnina	3	3	4	3	4	3	2	—
Acrocladium cuspidatum	—	4	—	—	5	—	3	—
Brachythecium rivulare	—	—	—	2	—	—	—	—
Bryum bornholmense	—	—	—	1	—	—	—	—
B. micro-erythrocarpum	—	—	1	1	—	—	—	—
Eurhynchium praelongum	5	—	—	—	—	—	—	—
E. swartzii	—	—	—	—	2	2	—	—

The Otmoor locality resembles more the east English fens. Again there is no information on the vegetational history of the area, but Otmoor has been extensively drained in the last century, with mixed success. The species associated with *Viola stagnina* here (see Table I) show the locality to be in a somewhat intermediate position between the Fen at Woodwalton and the meadow at Menmarsh. The Otmoor fen has such species as *Filipendula ulmaria, Galium palustre, Phragmites communis* and *Thalictrum flavum* in common with Woodwalton, and *Cirsium dissectum, Cardamine pratensis, Juncus conglomeratus* and *Poa trivialis,* in common with Menmarsh. The lists in Table I are arranged in order of increasing dryness, the last being that from the meadow on Otmoor that has *Viola canina* and hybrids with *V. stagnina,* but no *V. stagnina.* The presence here of *Briza media, Festuca pratensis, Holcus lanatus, Lotus corniculatus* and *Sanguisorba officinalis* indicates that it is a much better drained area than any of the others.

The data recorded here indicate that in Oxfordshire, *Viola stagnina* is suffering as a result of drainage, though it has not yet been eliminated, as it has in some areas. It is in fact displaying a remarkable persistence in the face of the increasing dryness in both localities. In addition at Menmarsh ploughing and grazing have failed to destroy it. There are many other similar areas in the Oxford region, and *Viola stagnina* may yet be found in some of them.

Further investigations are in progress, both of the ecology of this species and of its hybridization with *Viola canina.*

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PRIMULA ELATIOR IN NORFOLK; IMMIGRANT OR RELIC?

By S. R. J. Woodell
(Botany School, University of Oxford)

The Oxlip, *Primula elatior,* was apparently known to be in Norfolk in the 1840's, and was first recorded there with certainty by Galpin in 1888. The locality, at Dickleburgh, north-east of Diss, is about 16 miles from the edge of Miller Christy's (1922) "Oxlip area".

Miller Christy visited the area in 1912 and some of the details of his account led me to attempt to refind the population more recently. I failed to find *Primula elatior* in 1961, but a more intensive search in 1963 was successful. Neither the site nor the nature of the population are as Christy described them, and it is these differences that will be discussed here.

Christy described the plants as being confined to a small hummock, about 150 square yards in extent, rising two-and-a-half to three feet above the level of the boggy meadow known as the Moor, which was, and is, frequently flooded in winter, and which has *Caltha palustris* in abundance. The hummock was of a peaty soil, remaining damp even when the surrounding lower ground was dry, and it was covered with a species of *Carex*. Christy suggested that it might be an old beaver dam or an earth-work associated with a prehistoric dwelling but he gave no evidence in support of this view. In 1912 he saw "probably less than two score (plants) growing in association with about as many Cowslips and perhaps a dozen hybrids between the two". It was this last statement that led to my interest in the site, since the hybrid between *Primula veris* and *P. elatior* is very rare in nature, and very difficult to produce under artificial conditions. Valentine (1952) and Woodell (1960) have discussed the reasons for this. Therefore the possibility of a number of such hybrids in one spot was worth investigating.

The attempt to find Christy's locality was unsuccessful at first since the major part of Dickleburgh Moor has been reclaimed for arable farming. Local enquiry revealed that a hummock of the type described by Christy had existed and has now gone, having been ploughed up a few years ago. The only remaining hope was that *Primula elatior* existed elsewhere in the neighbourhood, and in 1963 this hope was realized.

The smaller part of Dickleburgh Moor, which has not yet been reclaimed, lies to the east of the small tributary of the river Waveney that drains the area. It is also mainly low-lying and boggy. In one corner of the area, bordering farmland, is a raised peaty area, rising to about 5 feet above the surrounding land, and about half-an-acre in extent. On this area there are several plants of *Primula elatior,* mainly near the top of the slope. Even in the flowering season it is not very obvious. In summer the area is so much overgrown with *Phragmites communis* and *Epilobium hirsutum* that the Oxlips are almost impossible to find, even when one knows where they are. In 1964 there were 10 plants of *Primula elatior* and two hybrids with *P. vulgaris.* Some of the plants were very large and vigorous. No individuals of *P. veris* were present, and the nearest that could be found were about 200 yards away. No hybrids between *P. veris* and *P. elatior* could be found.

The species present, assessed on the Domin cover-abundance scale, were:—

Agrostis tenuis	2
Carex riparia	2
Cirsium arvense	1
Epilobium hirsutum	5
Filipendula ulmaria	8
Galium aparine	2
Heracleum sphondylium	1
Phragmites communis	7
Primula elatior	3
Urtica dioica	4
Brachythecium rivulare	3

The fact that Christy did not mention *Phragmites communis,* which is such a conspicuous member of the community, and the absence of *Primula veris* both suggest that this site is not the one that Christy described, but another that has been overlooked.

This outlier is of interest for several reasons. It is the furthest from the main area of the Oxlip in East Anglia, and is 12 miles from the nearest known outlier at Great Gipping. The Oxlip's very close association with *Phragmites* is unique in Britain as far as I know, and I have no record of it growing in similar habitats on the Continent, where it is a plant of damp meadows. It does occur in wet streamside habitats at Cavenham and Tuddenham in Suffolk, but in both these places the associated flora is much more typical of woodlands.

The outliers of *Primula elatior* to the north and east of the main area include several which are along streams or in marshy ground. Since some are on streams which flow out of the main area they might be the result of establishment of seed carried downstream. Alternatively they may be relics of a wider area in the past. There is not sufficient evidence to determine which of these possibilities is correct. Within its main British area of distribution, *Primula elatior* is a woodland plant. Christy was of the opinion that it was a declining species, being "hybridised out of existence" by the advance of *Primula vulgaris,* which he regarded as an aggressive species invading the area. There is little evidence to support this view; within its main area *Primula elatior* is maintaining itself, except where clearance or drainage has made the habitat unsuitable. On the other hand, if the range was more extensive towards the north-east in the past, and if in this direction it was confined to more marshy places, drainage in the last few hundred years could well have wiped out all but a few small relic populations. The location of *Primula elatior* at Dickleburgh on an elevated hummock, away from the stream, and its absence in the swampy area by the stream, does not suggest that it is a recent migrant to the area; also, to have reached this spot, the seeds would have had to travel upstream along this tributary. Therefore I regard the view that this is a relic population of a once wider range as the more likely one.

The other interesting feature of this outlier is the fact that Christy, who was a reliable observer, reported a large number of hybrids between *P. elatior* and *P. veris* in the population. If the present locality is the same as that seen by Christy, either all the cowslips and hybrids have died out since 1912, or his observation was faulty. I regard either of these possibilities as remote: this locality is almost certainly a different one. It is unfortunate that his site has been destroyed, because the discovery of a mixed population of these two species and their hybrids would have been a great help in extending our knowledge of their hybridization in the field. This is the subject of another paper now in preparation.

The author is in receipt of a research grant from the Nature Conservancy, to whom thanks are due.

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TWO FORMS OF EQUISETUM VARIEGATUM AT BRAUNTON BURROWS

By J. A. Crabbe, A. C. Jermy and G. A. Matthews
(Department of Botany, British Museum (Natural History), London, S.W.7)

Whilst botanising at Braunton Burrows, North Devon (vice-county 4), in 1963 one of us (G.A.M.) was struck with the variation shown by clones of the horsetail *Equisetum variegatum* in and at the edge of one of the largest dune slacks. There were two obvious forms intermingled, not only the prostrate slender one usually restricted to sand-dunes, but also an erect robust one usually associated with various other habitats and resembling var. *wilsonii.* So striking was the appearance in 1963 of these two plants that several botanists sent material from Braunton Burrows to the British Museum (Natural History) for identification, and this interest prompted us to look into the taxonomy of this group of horsetails.

The subgenus Hippochaete to which this species belongs has been monographed by Hauke (1963) who, apart from one variety of N.-W. America, dismisses the variation seen in the species as being within its range.

A monograph of the whole genus by Milde (1867) gave thirteen varieties, mostly continental European, but including Newman's var. *wilsonii.*

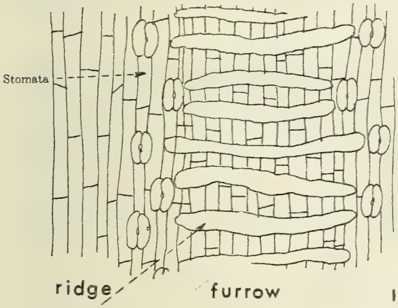
Previous to this the British pteridologist Edward Newman (1844, p. 41) had discussed nine unbranched forms of *Equisetum,* among which were the creeping and erect forms of *E. variegatum.* His var. *wilsonii,* collected in a ditch in Killarney, was an erect smooth-stemmed plant in contrast to the rough stem of all the other varieties; Newman several times mentioned the smoothness of the stem and regarded it as "alone a sufficient diagnostic" (p. 40); a specimen at the British Museum (Natural History) labelled "Mucross, Mr Wilson", a possible candidate for the type of var. *wilsonii,* has however siliceous tubercles on the ridges giving a roughness to the stem, and we think this specimen was not from Newman's original sample.

On looking at the stem epidermis pattern and the distribution of siliceous tubercles, there is an obvious difference between the two plants from Braunton Burrows (Figs. 1 and 3). This difference is also reflected in the cross-section of the internode (Figs. 2 and 4).

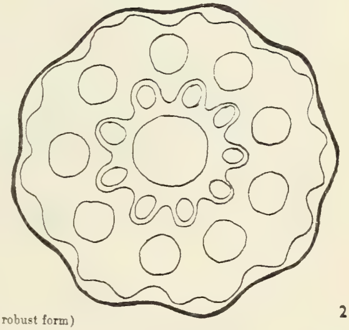
E. variegatum is sometimes confused with unbranched forms of *E. palustre* whose cone, however, bears no apiculus, and compara-

STEM SURFACE

T.S. INTERNODE

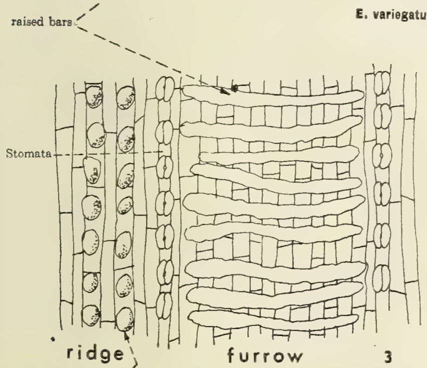


1



2

E. variegatum (erect robust form)



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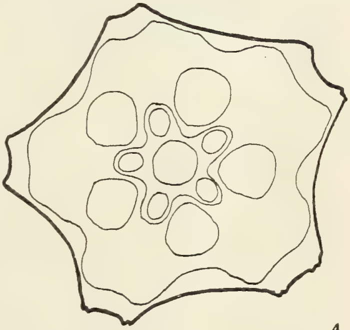
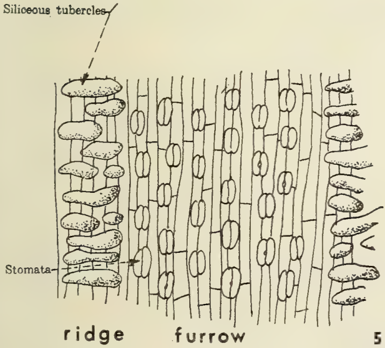


4

E. variegatum (prostrate slender form)



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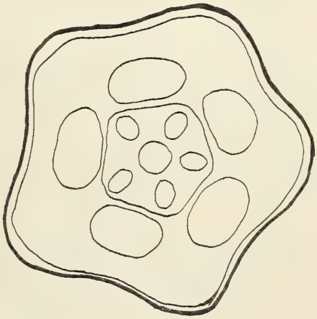

6

E. palustre (unbranched form)

tive drawings (Figs. 5 and 6) show other differences.

Milde (1867, p. 583) stated that from England he repeatedly received as *E. wilsonii* quite normal *E. variegatum* and even *E. trachyodon,* which indicates the difficulty and confusion in this group. To-day, the application of the name *"variegatum"* is confused; the epithet *wilsonii* is sometimes used for the erect form of a prostrate *"variegatum",* and the epithet *arenarium* is sometimes used for the prostrate form of an erect *"variegatum".*

It is not the intention of this small contribution to settle the taxonomy of *E. variegatum* in Britain, but we felt it worthwhile to bring to readers' notice the characters that are considered valuable in this group of horsetails, so that further work may be started.

The Braunton Burrows specimens referred to are in the Herbarium of the British Museum (Natural History).

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YET MORE ADDITIONS TO THE FLORA OF FAIR ISLE

By R. C. Palmer and W. Scott

In August 1963 we visited Fair Isle (v.c. 112) and made a detailed study of the flora. Most of the species recorded by previous observers—Trail (1906), Pritchard (1957), Fitter (1959) and Currie (1960)—were seen, as well as some others not previously recorded. In addition some interesting unpublished records by other observers have come to light; these are included below. Our paper is arranged in two parts:

(1) New records.

(2) Confirmations of species reported from Fair Isle by Mrs. Hannah Stout but thought by Fitter (1959) to be in need of verification. The stations given are not necessarily those of Mrs. Stout. Specimens of most of the plants recorded by us may be found in herb. Scott. The nomenclature and order mainly follow Dandy (1958).

1. NEW RECORDS

Botrychium lunaria (L.) Sw. Bu Ness; School, 1957, Miss J. Clapham and Miss A. Martin.

Ophioglossum vulgatum L. Small colony on top of Malcolm's Head, c. 1953, G. B. Corbet. This doubtless refers to the following subspecies.

Subsp. ambiguum (Coss. & Germ.) E. F. Warb. Bird Observatory; near Furse, 1957, Miss J. Clapham and Miss A. Martin.

Raphanus raphanistrum var. aureus Wilmott. A weed in several places, R. C. Palmer and W. Scott.

Cerastium glomeratum Thuill. Bu Ness, 1957, I. A. Williams.

Sagina subulata var. glabrata Lange. Ward Hill, 1959, G. Millington. In several dry rocky or stony places, R. C. Palmer and W. Scott.

Ulex europaeus L. Planted at Vaadal!, P. E. Davis.

Apium inundatum (L.) Reichb. f. Burn of Gilsetter!, c. 1953, G. B. Corbet. This is known only from one other district of Shetland, the island of Papa Stour.

Polygonum aviculare L., *sensu stricto*. Fair Isle, 1956, N. M. Pritchard (*Hb. Oxon.*). Waste ground by roadside near Shirva, W. Scott. Both det. B. Styles. The segregate has not hitherto been observed elsewhere in Shetland.

P. boreale (Lange) Small. Cornfield, Busta, 1957, Miss J. Clapham and Miss A. Martin. Oatfield below ruined croft, Quoy, R. C. Palmer. Cornfield, Shirva, W. Scott.

P. arenastrum Bor. Fair Isle, 1956, N. M. Pritchard (*Hb. Oxon.*). Sandy seashore, North Haven; roadside near Schoolton, W. Scott.

Euphrasia marshallii Pugsl. In various places along the coast, R. C. Palmer and W. Scott, det. E. F. Warburg. Possible hybrids with *E. confusa* and *E. foulaensis* were also observed.

Littorella uniflora (L.) Aschers. In several places, 1957, Miss J. Clapham and Miss A. Martin. Golden Water!, Dr. M. E. Gillham.

†Senecio smithii DC. In two places!, P. E. Davis.

†Aster foliaceus Lindl. A patch by road at Stonybreck, W. Scott, det. D. Philcox.

Sonchus arvensis var. glabrescens Günth., Grab. & Wimm. Schoolhouse!, c. 1953, G. B. Corbet.

Sparganium angustifolium Michx. ? Stream in the Sukka Moor area, 1959, G. Millington. Barren material only but more likely to be this than *S. minimum*, det. C. D. Cook.

Eleocharis quinqueflora (F. X. Hartmann) Schwarz. Peat-pan on Sukka Moor, and in three other places, R. C. Palmer.

Puccinellia distans (Jacq.) Parl. At several points on the coast, R. C. Palmer.

†Hordeum vulgare L. Scattered specimens in oatfield near Kennaby, R. C. Palmer.

†Avena strigosa Schreb. In crops (once cultivated)!, 1959, G. Millington.

†A. sativa L. Casually on pasture reverting to moorland below ruined croft, Field, R. C. Palmer.

Arrhenatherum elatius (L.) Beauv. ex J. & C. Presl. Oatfield by roadside near Shirva, R. C. Palmer.

Alopecurus pratensis L. Cultivated ground, Taing, R. C. Palmer.

2. CONFIRMATORY RECORDS

Hymenophyllum wilsonii Hook. Ravine of Burn of Gilsetter, c. 1953, G. B. Corbet and later observers.

Stellaria alsine Grimm. Wirrvie Brecks, 1957, Miss J. Clapham and Miss A. Martin. In several wet places, R. C. Palmer and W. Scott.

Chenopodium album L. Vegetable patch, Hool, R. C. Palmer.

Linum catharticum L. Damp mossy ground, Homis Dale, etc., R. C. Palmer.

Lathyrus pratensis L. Fair Isle, at the south end!, c. 1953, G. B. Corbet.

Potentilla palustris (L.) Scop. Marsh north-east of the Church, R. C. Palmer.

†Aegopodium podagraria L. About Rock Cottage, W. Scott.

Polygonum persicaria L. Garden of Rock Cottage!, Miss N. G. Dyke.

Myosotis discolor Pers. Cutting near Furse, 1957, Miss J. Clapham and Miss A. Martin. Cultivated ground, Taing, R. C. Palmer.

†Veronica persica Poir. Yard of croft at Leogh, etc., R. C. Palmer.

Odontites verna (Bellardi) Dumort. subsp. verna. Grass field below Post Office, 1962, D. Harle. Edge of cornfield near the Haa, etc., R. C. Palmer.

Of the 23 plants listed by Fitter as needing verification 11 are confirmed above. Of the remainder, 6 have already appeared in the pages of *Proceedings* of the B.S.B.I., namely *Polypodium* *vulgare, Ranunculus ficaria, Viola tricolor, Spergularia media, Trientalis europaea* and *Glaux maritima.* This leaves 6 species unconfirmed, but as *Empetrum hermaphroditum* seems to have been recorded through a misunderstanding only 5 remain to be looked for: *Epilobium parviflorum, Anagallis arvensis, Chrysanthemum leucanthemum, Dactylorhiza purpurella* and *Eriophorum vaginatum.*

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SPARTINA IN WEST NORFOLK

By E. L. Swann

At a joint meeting of the British Ecological Society and the Botanical Society of the British Isles, held at Southampton in 1956, Dr. C. E. Hubbard reviewed the genus *Spartina* and surveyed the origin and spread of *S.* × *townsendii*. He drew attention to the fact that the original hybrid was male-sterile and spread vegetatively. Specimens of more recent gatherings from the south coast agreed in morphological characters with the type-specimens. He concluded his talk by referring to the seed-bearing plant which is both widespread and abundant round the English coast, differing morphologically from the original plant, and at present without a name.

Dr. Marchant of Kew has recently (1963) carried out cytological investigations of *Spartina* showing corrected chromosome numbers for *S.* × *townsendii* and its parent species. For *S. alterniflora* he found the number to be $2n=62$, not 70; for *S.* × *townsendii*, the male-sterile hybrid, $2n=62$, not 63; whilst for the fertile plant, $2n=124$ (or 120 and 122), not 126; *S. maritima* had $2n=60$, not 56.

I accompanied Dr. Hubbard recently to Wolferton and he pointed out three small colonies of the male-sterile hybrid. They were found to occupy somewhat higher ground on the landward side of Wolferton Creek and this habitat preference has been observed elsewhere at Burnham Overy Staithe and along the east bank of the River Ouse at King's Lynn. Dr. Hubbard also found one small colony on the salt-marsh at Holme-next-the-Sea again on the landward side. It would appear that this habitat difference, likewise apparent on the south coast, is suggestive of ecological separation. Examination in the field shows these male-sterile plants to have a greater number of tillers per given area than the fertile plant, some of the colonies giving an appearance of a field of corn. They have shorter and narrower spikelets; more erect and relatively narrower leaves which are less glaucous; shorter ligules; and smaller, indehiscent anthers.

Measurements of five spikes gathered at random gave the following results:

	MALE STERILE HYBRID	FERTILE HYBRID
Leaves	21·2-16·0 cm. × 0·8-0·6 cm.	22 -17 cm. × 1·2-0·9 cm.
Ligule	1·5- 1·2 mm.	3·5- 2·0 mm.
Inflorescence	18·5-13 cm.	20·5-17·0 cm.
Bristle	2·5 cm.	3·0 cm.
Lower glume	14 -10 mm.	21 -11 mm.
Upper glume	16 -15 mm.	33 -18 mm.
Spikelet width	24 -17 mm.	30 -27 mm.
Anther	7·5- 6 mm.	10 - 9·0 mm.

The seed-bearing plant, previously known as *S.* × *townsendii* but at present without a name, has had a long history in West Norfolk. A boatload of plants, that may have come from Poole in Dorset, was introduced north of King's Lynn in 1910. They have now spread as far as the outlet of Wolferton Creek, a distance of some seven miles, in an unbroken colony of many hundreds of acres. Local fishermen and wildfowlers have blamed the invasion of the so-called "Rice-grass" for the blocking-up of channels and the disappearance of *Zostera* which has been the food-plant of wigeon.

This plant is not only the best known example of a natural hybrid with chromosome doubling but also must be a good example of preadaptation described by Huxley (1942) which "is by its peculiarities predisposed to take advantage of a certain type of environment" for "it is clear that any form arising by a sudden large change, as by autopolyploidy, or still more by hybridization and allopolyploidy, must be preadapted in some way if it is to survive". It has certainly proved to be better adapted than either of its parents to their habitat of salt-marsh and mud-flats and it is this factor that has presumably accounted for its rapid spread.

At Wolferton a few stunted and dark crimson-coloured plants grow along the margins of the beach. Such aberrant forms are most likely due to the edaphic factors of superposed layers of fine shingle and comminuted shells, mainly cockle, of high calcium content.

The native *S. maritima* (Curt.) Fernald, material of which from Wolferton was investigated by Marchant, is becoming increasingly rare in this station. It is evident that high pressure of trampling and grazing by cattle is responsible. It is more or less confined to 'depression pans' in the upper parts of the salt-marsh among communities of *Puccinellia maritima* and *Festuca rubra*. Although many of these depressions are transitory there are others that persist which become both stable and permanent (Tansley). Only the highest spring tides have any scouring action on the channels of the high marsh. The rate of deposit of silt is greater than the tidal action keeping these channels clear and they become blocked at intervals and eventually reduced to a series of pools. Vegetation invades but the centres remain bare as the trapped water stagnates and the salt-content increases. The surrounding margins support the native *Spartina*. "*S.* × *townsendii*", the fertile plant, also grows around these pans but is not luxuriant as in the more mobile mud of the lower zone and the result of the two taxa in competition is on a reduced scale. It would appear from observations at Wolferton, Burnham Overy Staithe, and at Blakeney in East Norfolk, that the native species can tolerate the more extreme conditions of desiccation by way of infrequent tidal submergence and high but variable salinity. Its narrower leaves, which are more erect, fail to trap as much flotsam as *S.* × *townsendii* and the colonies are kept relatively free from smothering algae. The writer is grateful to Dr. Hubbard for his helpful criticism of the note in manuscript.

REFERENCES

HUXLEY, J., 1942, *Evolution*, 449.
MARCHANT, C. J., 1963, *Nature*, **199**, 923.
TANSLEY, A. G., 1939, *The British Islands and their Vegetation*.

PLANT NOTES

21/a. **Dryopteris assimilis** S. Walker, 1961, *Amer. J. Bot.*, **48**, 607 (footnote); *Lastrea dilatata* var. *alpina* T. Moore, 1856, *Nature Printed Ferns of Great Britain and Ireland*, sub tab. 22 (sine figura); 1857, *Handbook Brit. Ferns*, ed. 3, 126; 1859, *Nature Printed Brit. Ferns*, 225. V.c. 88, Mid Perth; Ben Lawers, 1855, T. Moore (*Hb. Kew*) (Lectotype and syntypes).

The following description is given by Walker and Jermy (1964).

Rhizome short, erect or ascending, often with several crowns. Fronds 7-60 cm. long; stipe pale brown darkening only at the base, scaly below, *scales* ovate-subdeltate *abruptly acuminate into long, often falcate, apex* $\frac{1}{5}$-$\frac{1}{3}$ *of total length, light brown*, usually with well-defined dark brown central stripe; *blade* 1-1½ times length of stipe, *light green*, thin, linear-lanceolate, often almost parallel-sided below, apex acute, bi-tripinnate; *pinnae* narrowly triangular to linear, *the lowermost one having a markedly longer basal pinnule on the lower side which is about half as long as that pinna; pinnules finely pinnatisect*, with mucronate teeth. Sori situated in two rows near the pinnule midrib, c. 1 mm. in diam., with small indusia which are glandular on the margin and soon become evanescent. Spores 45-50μ × 30-37μ, with thin, pale brown perispore with a few narrow wings and *widely spaced acute spinules up to 1μ in length.*

While Ben Lawers is the only locality from which this fern is known with certainty, Walker and Jermy (1964) have examined herbarium specimens at the British Museum and Kew and have seen material from v.c. 65, 66, 70, 72, 88, 89, 92, 98-100 and 104 which may be referable to this species.

REFERENCE

Walker, S. & Jermy, A. C., 1964, Dryopteris assimilis S. Walker in Britain, *Brit. Fern. Gaz.*, **9**, 137-140.

61/c. Glaucium corniculatum Curt. 28, W. Norfolk; ash-tip at The Loke, King's Lynn, John Hodgson, B.S.B.I. Excursion.

The alien red horned-poppy has had a somewhat fitful history in Norfolk. Originally found by Stillingfleet who sent it to Hudson in 1755 it was not seen again until 1885 when it was found by John J. Kidd who published his find in Hardwicke's *Science Gossip*—"Perhaps it may interest your readers to know that I found on a waste patch of ground in the vicinity of this town (King's Lynn) July 14th, 1885, a specimen of *G. phoeniceum* Crantz; without doubt it is an introduction".

In 1915 it was found by W. G. Clarke on a waste patch of ground in Norwich, an introduction by foreign barley.—E. L. Swann.

137/r. **Minuartia recurva** (All.) Schinz & Thell., 1907, *Bull. Herb. Boiss.*, sér. 2, **7**, 404; *Arenaria recurva* All., 1785, *Fl. Pedem.*, **2**, 112; *Alsine recurva* Wahlenb., 1813, *Veg. clim. Helv.*, 87; *Sabulina recurva* Reichb., 1832, *Fl. Germ. exc.*, 788; *Tryphane recurva* Reichb., 1842, *Ic.* **v, 29** t. ccviii. fig. 4930; *Alsine verna β recurva* Fiori & Paol., 1898, *Fl. anal. Ital.*, **1**, 343. H.3, W. Cork; east of Knockowen in the Caha Mountain range, in small cracks in large old red sandstone slabs dipping steeply to the south-east,

c. 1,800-2,000 ft., 1964, V. GORDON, N. HAMILTON, L. REID, M. SCANNELL, J. QUAIN and J. J. MOORE. A later survey carried out by Father Moore revealed two populations (about 1,000 plants in each) a mile apart and showed also that the plant occurred in v.c. H.1, S. Kerry.

Plant perennial, densely caespitose, with woody stems. Flowering stems 1·5-5 cm. tall. Leaves 4-7 mm., 3-veined, recurved, awl-shaped. Cymes 1-4-flowered; sepals 3-5 (6) mm., ovate-lanceolate, 5-(7) veined at base (best seen when capsule is ripe); pedicels 2-3 times as long as sepals; pedicels and sepals with outstanding, gland-tipped hairs. Petals white; twice as long as sepals. Capsule slightly longer than sepals. Seeds kidney shaped.

A native of mountainous areas in southern Europe from Portugal and Spain eastwards to Bulgaria and Romania, and extending northwards to Switzerland and France. The Irish populations, which Father Moore points out appear to come under subsp. *recurva*, represent the most northerly extension to the known range of the species.

I am indebted to Father Moore for much assistance in compiling this note.—D. H. KENT.

320/3. **POLYGONUM MARITIMUM** L. 3, S. Devon; on coarse shell sand on the spit on the northern side of the mouth of the river Teign, Teignmouth, 1954, D. M. BARLING, conf. B. T. STYLES. Despite intensive studies on the *Polygonum aviculare* group the specimens of *P. maritimum* from Devon were the first post-war material of this interesting species that I had seen from the British mainland, where I had thought it might be extinct.

On visiting the Teignmouth site last year, Mr. Barling was unable to find any plants of *P. maritimum*, and fears that possibly because of dredging operations the habitat may have been completely destroyed.

It would be useful if botanists living in, or visiting, coastal areas would make an intensive search for the species which may be surviving in small pockets, or indeed appearing sporadically and then disappearing again owing to tidal movements and the activities of man.—B. T. STYLES.

400/9. **MYOSOTIS DISCOLOR** Pers. The map of the distribution of this species in the *Atlas of the British Flora* (p. 215) is strikingly anomalous. There is a region of high incidence in southern England and the Midland limestone belt, then a gap covering much of northern England and North Wales, then a second region of high incidence covering almost the whole of Scotland and its islands. The Irish distribution is presumably too incomplete to be meaningful within this overall pattern.

The most likely explanation seems to be that at least two distinct races are involved with different climatic (perhaps also edaphic) preferences, one or more boreal and native and one or more southern and possibly partly or wholly adventive. Of seven infraspecific taxa reported for Britain, however, no single one can be unequivocally identified on present evidence as essentially a Scottish race. Var. *dubia* (Arrondeau) Wade seems the strongest possibility. Distinguished by its extremely small (1-2 mm.) corolla, at first pure white, later pale blue, relatively long calyx-tube and stem with spreading hairs, it was raised to subspecific rank by Vestergren (1930, *Svensk Bot Tidskr.*, **24**, 463), who considered it a distinct race of Atlantic Europe. All material of the species from the Faröes seen by him came under this. According to A. & D. Löve (1961, *Opera Bot.*, **5**, 291), who keep up this subspecies, it does not appear to have been examined cytologically.

In the hope that this species will attract more detailed study, attention may also be usefully drawn here to the fact that in the west and north of the British Isles *M. discolor* frequently occurs in marshy fields, damp woodland rides and dune slacks. E. S. Edees (1961, *N. Staffs. J. Field Studies*, **1**, 134) finds it more often in such places in Staffordshire than in the dry habitats normally indicated for it in British floras. In the Isle of Man, as well as in cornfields and on dry, bare ground, it occurs in marshes among rushes, in a tall, very strict form. This may well be a distinct ecotype.—D. E. ALLEN.

403/B. **Brunnera macrophylla** (Adam) I.M. Johnston, 1924, *Contrib. Gray Herb.*, n.s., **73**, 54; *Myosotis macrophylla* Adam, 1805, in Web. & Mohr., *Beitr. z. Naturk.*, **1**, 46; *Anchusa myosotidiflora* Lehm., 1818, *Asperif.*, **1**, 234; *Brunnera myosotidiflora*, Stev., 1851, *Bull. Soc. Imp. Nat. Mosc.*, **24**, 582. 14, E. Sussex; over-running the derelict Old Mill Gardens, Wannock, and escaping on to a laneside, 1956; site now built over, D. P. Young: 17, Surrey; Warlingham, in chalk scrub below houses, 1958, R. Clarke (as *Omphalodes verna*), det. D. P. Young, *Proc. B.S.B.I.*, **3**, 407. Edge of downs, Coulsdon, 1962, B. M. C. MORGAN. Munstead, Busbridge, roadside opposite old house, one plant, obviously outcast or planted, 1962, O. V. POLUNIN (as *Omphalodes verna*); 1964, D. P. YOUNG, 33, E. Glos.; spreading on a roadside near a cottage near Withington, 1952, C. C. Townsend, det. A. Melderis, *Proc. B.S.B.I.*, **1**, 175. 82, Haddington; small colony by roadside near Dirleton church, established for 10 years, 1964.—E. P. BEATTIE.

Plant perennial, somewhat hispid, branched from base, up to 45 cm. tall; stems slender and leafy; basal leaves long-petioled, ovate 7·5-15 (20) cm. across, cordate or reniform at base; lower stem-leaves similar but much smaller, all entire, and with shorter petioles; upper stem leaves narrower, tapering to a short petiole. Calyx bell-shaped, 15 mm. long, deeply cleft; corolla tube almost campanulate, 2-3 mm. across, pink in bud, sky-blue, with yellow throat, when open. Flowers long-pedicelled in panicled racemes. Nutlets 3 mm. long, dull brownish-grey in colour. In appearance the plant has *Myosotis*-like flowers and *Symphytum*-like leaves. A native of the western Caucasus, introduced into cultivation about 1830. I am indebted to Dr. D. P. Young for records and for pointing out that in most British floras *B. macrophylla* keys down to *Omphalodes verna*!—D. H. KENT.

413/1. SOLANUM DULCAMARA L. On the 12th July 1964 I was out with A. W. Robson on the silted river shingle of the Tay near Dalguise, north of Dunkeld in Perthshire. We were walking through an area thickly overgrown with shrubs, when we noticed a shoot of *Solanum dulcamara* hanging from a sallow. It seemed to be of unusual length, and consequently we carefully measured it. The main stem proved to be no less than 21′ 8″ long. There was at least one other stem of comparable length from the same root; and it is quite possible, because we did not search, that there may have been longer lianas elsewhere. This particular shoot trailed to the upper branches of a sallow, ran across it, and reached most of the way to the ground on the other side. It was in bloom but probably little or no direct sunlight ever reached this plant; while its roots will no doubt frequently have been under water when the river was in spate. On the 29th November 1964 I noticed in scrub at Bucknall, Oxon., plants which my cousin, Mrs. Nicholson, subsequently measured as about 12′ long. No doubt similar lianas exist in tall, tangled vegetation elsewhere, though I know of no other records of this plant growing anything like so long; indeed I know of no book which gives more than two metres for its length. I did not collect the plants!—D. McClintock.

490/1. Linnaea borealis L. On 24th May 1964, we found a colony of this species in County Durham (V.c. 66). The plant was growing in damp, shaded hollows between rocks and among the surrounding heather by the heaps of an old sandstone quarry at the head of Rook Hope at an altitude of approximately 1,600 ft. The colony occupied an area of only a very few square metres. We revisited the colony on 12th July 1964, but found no evidence that the plant had flowered or was likely to do so this year.

This appears to be the first record for *Linnaea borealis* in V.c. 66 and the only locality at present known in England. The plant was known from approximately 1819 until nearly 1900 in a plantation of *Pinus sylvestris* L. at Catcherside (V.c. 67), which is 28 miles N.N.E. of Rook Hope, and during a period of a few years around the latter date in another pinewood about one mile N. of the first (G. W. Temperley, 1930, *Vasculum*, **16**, 137). It is known that trees were imported to Catcherside directly from Norway about 1770, although it was not the universal opinion of local botanists that *Linnaea borealis* was introduced into Northumberland. The species was also found in a number of pinewoods in Berwickshire and Roxburghshire, just across the Border. At any rate, whether or not the plant was native in Northumberland, it appears not to have been seen in the Catcherside region within the past sixty years or so.

The valley of the Rookhope burn is bare and treeless, although about two miles away, just over the watershed around Allenheads (V.c. 67), are extensive coniferous plantations. It is possible that trees might have at one time been imported there from Norway, although there is no evidence that *Linnaea borealis* has ever been found in the Allenheads area. There is no reason to suspect that the species arrived at its present locality in Rook Hope as a direct result of human agency. On the other hand, the quarry where it is growing was worked to about 130 years ago and the ground where the plant now grows was therefore disturbed. Although many books and Floras mention pinewoods as the habitat for the species, other shaded habitats are possible and the limitation of the plant to north-eastern Britain reflects the low winter temperature requirement of the species (F. H. Perring & S. M. Walters, 1962, *Atlas of the British Flora, p.* xx, xxi).—G. A. Swan and M. Swan.

506/4. Senecio squalidus L. This species is recorded for the first time in Northern Ireland by T. D. Boyd (1965, *Irish Nat.* **J**, 15, 21). The plant was first noted in May 1964 growing over an area of about half an acre near stacks of imported timber in Belfast Harbour Estate. Since May the finder has found the plant occurring frequently over a twenty-acre area in the Harbour. Mr. Boyd rightly points out that although *Senecio* *squalidus* has often spread overland in association with railways, the Belfast colony is probably the result of ship-borne import from outside Ireland. This is comparable with the introduction of the species into Denmark in 1954 (Pedersen, 1961), Northern France in 1956 (Lousley, 1957) and the Channel Islands in 1957 (McClintock, 1959).

REFERENCES

BOYD, T. D., 1965, Oxford Ragwort, Senecio squalidus L., in Northern Ireland, *Irish Nat. J.*, **15**, 21.

LOUSLEY, J. E., 1957, Senecio squalidus L. et Viola nana (DC.) Corb. dans le Pas-de-Calais, *Monde des Plantes*, **319**, 19.

MCCLINTOCK, D., 1959, Three plants likely to spread in the Channel Islands, *Rep. & Trans. Soc. Guern.*, **16**, 315-316.

PEDERSON, A., 1961, Kurvblomsternes udbredelse Danmark (ekskl. Hieracium og Taraxacum), *Bot. Tidsskr.*, **57**, 81.

D. H. KENT.

678/1b. **Dactylis glomerata** subsp. **hispanica** (Roth) Nym., 1882, *Consp. Fl. Eur.*, 819; *D. hispanica* Roth, 1797, *Cat. Bot.*, *1*, 8; *D. villosa* Ten., 1813, *Prodr. Fl. Nap.*, ix, non Thunb.; *D. cylandracea* Brot., 1804, *Fl. Lusit.*, **1**, 99; *D. glomerata β hispanica* Gaud., 1836, *Syn. Fl. Helv.*, 55; *D. glomerata β australis* Willk., 1870, in Willk. & Lange, *Prodr. Fl. Hisp.*, **1**, 88; *D. woronowii* Ovčinnikov, 1934, in *Flora U.R.S.S., Add.*, 752. V.c. H.3, W. Cork; island west of Glandore harbour, 1963, M. J. P. Scannell and J. Emmet O'Donovan, conf. M. Borrill (1964, *Irish Nat. J.*, **14**, 282).

A low-growing densely tillering grass with compact, ovate flower heads. Leaves short, sometimes broad and tapering, with slightly inflated sheaths. Lemmas divided into two blunt lobes from the middle of which arises a very short awnlet, or sometimes a mere point which does not reach the size of an awn. Whole plant often greyish-green and glaucous.

D. glomerata subsp. *hispanica* is a very variable plant and is often difficult to distinguish from depauperate forms of *D. glomerata* subsp. *glomerata;* the one reliable character for the separation of the two subspecies is the split lemma in the former. There are a number of records of *D. glomerata* subsp. *hispanica* as an adventive in the British Isles, but this is apparently the first record as a native species*.

Native of Spain, Portugal and North Africa to the Crimea and Caucasus.—D. H. KENT.

703/p. **Polypogon pumilus** Clarke, 1814, *Travels in various countries of Europe, Asia and Africa*, **2**, 2, 41. Specimens resembling this species have been found recently amongst aliens on Crown Wallpaper Tip, Darwen, S. Lancs. (v.-c. 59) by the Rev. C. E. SHAW, and at Linthwaite, S.-W. York. (v.-c. 63) by D. MCCLINTOCK.

P. pumilus has been subject to misinterpretation and confusion. It was described by the Rev. Dr. E. D. Clarke from his specimens collected near Rosetta in Egypt in September, 1802. An abbreviated description of *P. pumilus* was given by K. Sprengel in his "*Neue Entdeckungen im ganzen Umfang der Pflanzenkunde*, **3**, 163 (1822), who considered the plant in question to be "*P. maritimus* Cand.?" which seems to be an unpublished

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*Miss Scannell informs me that she thinks that *D. glomerata* subsp. *hispanica* may be adventive in the W. Cork locality.—ED.

name. In *Index Kewensis*, **2**, 601 (1895) the reference to *P. pumilus* reads as follows: "*pumilus*, (Soland. in) Clarke, *Trav.* iii.41=*maritimus*". This entry is incorrect for three reason: first, regarding the authority for the species, there is no indication in Clarke's "*Travels*" that Clarke's specimens were treated by Solander or anyone else, therefore the authority should be attributed to Clarke; second, the volume number should be **2**, 2; third, *P. pumilus* should not be regarded as a synonym of *P. maritimus* Willd. A close examination of the type specimen (holotype) revealed that *P. pumilus* is more closely related to *P. monspeliensis* (L.) Desf., because its glumes are only slightly notched at the tip and minutely ciliate on the margins. In *P. maritimus* the glumes are deeply notched at the tip and minutely ciliate on the margins. In *P. maritimus* the glumes are deeply notched at the tip, with long cilia on the margins. *P. pumilus* differs from stunted specimens of *P. monspeliensis* in having shorter awns of the glumes and smaller anthers. It would be desirable to check these characters under cultivation. Also cytogenetical studies could provide a valuable clue regarding the taxonomical status of this plant.

P. pumilus seems to have been neglected by all writers on the Egyptian flora. Its holotype with other Clarke's specimens are now preserved at the British Museum (Natural History). They were purchased from the Saffron Walden Museum in 1934. Formerly they were in herb. A. B. Lambert and herb. G. S. Gibson.

An amplified description of *P. pumilus* has been made from examination of the type specimen and is given below:

Annual, 5·5-7·5 cm. high. Culms numerous, in small tufts, geniculately ascending, rigid, 3-5-noded, branched near the base, sheathed nearly up to the panicle, slightly scabrous beneath the panicle. Leaves green; sheaths long, glabrous in the lower part, scabrous upwards, inflated; ligules 1-1·5 mm. long, scarious, shining, minutely hairy, lacerate at the apex; blades pointed, flat, 5-15 mm. long, 1-1·5 mm. wide, more or less spreading, scabrous on the nerves of the upper surface and on the margins, minutely hairy beneath. Panicles unequal, very dense, ovate to oblong, 5-20 mm. long (excluding awns), 3-5 mm. wide. Rhachis scabrous; pedicels scabrous, very short, jointed. Spikelets narrowly oblong, 1·5-2 mm. long (excluding awns), 1-flowered, falling entire at maturity, with a very short portion of the pedicel. Glumes equal, rounded on the back in the lower part, keeled towards the apex, with short rigid hairs below, minutely hairy in the upper part, minutely ciliate on the margins, 1-nerved, slightly notched at the tip, with an erect awn, as long as or 1½ times the length of glumes. Lemma about 1 mm. long, glabrous, obscurely 5-nerved, awnless or with an awn equal to the length of the lemma. Anthers 0·3-0·4 mm. long.—A. MELDERIS.

PLANT RECORDS

Compiled by E. C. Wallace

"Plant Records" are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1964.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.* Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

1/4. Lycopodium clavatum L. 20, Herts; gravel pit south of St. Albans, with *Sphagnum* species, B. F. Sennitt, comm. J. G. Dony. 23, Oxon.; heathy railway bank near Banbury—perhaps the first Oxfordshire record this century, R. C. Palmer.

§3/2. Isoetes echinospora Durieu. *52, Anglesey; Llyn Llywenan, B. Seddon.

§4/1. Equisetum hyemale L. *44, Carm.; Carmel, Mrs. I. M. Vaughan, comm. B. Seddon.

4/4. Equisetum variegatum Schleich. ex Weber & Mohr. 98, Argyll; Coire Mhorair, Kinlochleven, D. Walkinshaw, comm. A. McG. Stirling.

§4/9×5. Equisetum × litorale Kühlew. ex Rupr. 14, E. Sussex; edge of pasture on Great Lywood Farm, near Ardingly, in some plenty and producing a few cones, R. C. Palmer, det. P. Taylor. ‡50, Denb., in great quantity without either parent, on the marshy edge of a stream at World's End, near Llangollen, P. M. Benoit (1964, *Nature in Wales*, **9**, 31).

†8/P. Pteris cretica L.; 23, Oxon.; established in cellar grating near St. Aldate's Church, Oxford, 1958-1961, now gone, R. C. Palmer.

16/1. Ceterach officinarum DC. 27, E. Norfolk; south wall of church at Forncett St. Peter when it was first recorded in 1886; a colony on an old wall at Loddon, J. Silverwood, comm. E. L. Swann.

19/1. Cystopteris fragilis (L.) Bernh. 23, Oxon.; cement wall of canalised urban stream, Watlington, one plant, J. Rogerson.

21/6×7. Dryopteris carthusiana × dilatata. 46, Cardigan; Borth Bog, P. M. Benoit (1964, *Nature in Wales*, **9**, 29).

22/3. Polystichum lonchitis (L.) Roth. 99, Dunbarton; gully in calcareous schist, Tullich Hill, Glen Douglas, A. McG. Stirling.

§24/5. Thelypteris robertiana (Hoffm.) Slosson. *†21, Middx.; a number of plants established on an old wall, with *Scolopendrium vulgare* and *Dryopteris filix-mas*, by the Thames at Staines, R. M. Payne, comm. D. H. Kent.

§25/a. Polypodium australe Fée. *44, Carm.; old wall, Pendine, together with *P. interjectum*, Mrs. I. M. Vaughan, conf. A. C. Jermy, comm. B. Seddon.

§25/i. Polylodium interjectum Shivas. *75, Ayr; Knockdolian Hill, Ballantrae, A. McG. Stirling. *82, Haddington; Balgone Estate, North Berwick, and elsewhere in the vice-county; *83, Edinb.; woodland bank near Marchbanks, Balerno, E. P. Beattie. *97, Westerness; limestone rocks near Blarmachfoldach, Fort William, A. McG. Stirling. *103, Mid Ebudes; cliffs near Port nam Marbh, Loch Spelve, Mull, A. A. Slack and A. McG. Stirling.

29/1. Ophioglossum vulgatum L. 12, N. Hants.; on chalk spoil heaps, Popham Beacons, R. A. Boniface and E. C. Wallace.

34/1. Juniperus communis L. 48, Mer.; one huge bush, 5 feet high and at least 13 ft. wide, with *Calluna vulgaris* and *Vaccinium myrtillus*, on acid scree near Llanfachreth; well known to local inhabitants, comm. N. Wenham. First record for Merioneth of the subsp. *communis* (1964, *Nature in Wales*, **9**, 30).

§34/1b. Juniperus communis subsp. nana Syme. ‡48, Mer.; mountain cliff, Cwm Aran, Cader Idris, one bush only, 1961-1962, Miss Veronica Paish, *et al.*; only previous Merioneth record of the species, apparently the same bush "many years" before 1932; now found to be referable to the subsp. *nana* (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 63; Benoit, P. M., 1963, *Nature in Wales*, **8**, 118). The record of *J. communis* from Harlech in Hyde, H. A. & Wade, A. E., *Welsh Flowering Plants*, ed. 1, is an error, P. M. Benoit.

†34/C. Chamaecyparis lawsoniana (Murr.) Parl. 23, Oxon.; growing out of stonework of stream, Osney, 1957→, R. C. **Palmer.**

58/4. Papaver hybridum L. 79, Selkirk; Selkirk Sewage Works, two plants, E. P. **Beattie.**

†61/6. Glaucium corniculatum Curt. 28, W. Norf.; ash-tip, Loke Road, King's Lynn, J. **Hodgson**, comm. C. P. **Petch** and E. L. **Swann.**

§62/1. Chelidonum majus L. ‡104, N. Ebudes; Portree, Skye, N. Dennis (1964, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 540).

65/3. Corydalis claviculata (L.) DC. 107, E. Sutherland; under bracken below sea cliffs, south of Ord of Caithness, 1962, B.S.B.I. **Field Meeting**, comm. A. McG. **Stirling** and E. R. **Bullard.**

§65/4. Corydalis lutea (L.) DC. *79, Selkirk; roadside wall, Selkirk; *82, Haddington; waste ground, East Linton, E. P. **Beattie.**

§72/1. Diplotaxis muralis (L.) DC. *82, Haddington; plentiful as a weed in a garden, North Berwick, E. P. **Beattie.**

†74/1. Raphanus raphanistrum subsp. landra (Moretti) Bonnier. 27, E. Norfolk; one mile inland from Great Yarmouth, J. **Silverwood**, conf. J. E. **Lousley**, comm. E. L. **Swann.**

§77/1. Cakile maritima Scop. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37).

89/1. Subularia aquatica L. 73, Kirkcudbr.; submerged in river Dee near Greenlaw, 1963, H. **Milne-Redhead.**

§94/2. Draba norvegica Gunn. *97, Westerness; Ben Alder hills, 3,400 ft., E. C. D. **Todd** and D. A. **Walkinshaw.**

94/3. Draba incana L. 102, S. Ebudes; limestone outcrops near Loch Lossit, Ballygrant; near Rubha Bholsa, Islay, A. McG. **Stirling.**

99/1. Cardaminopsis petraea (L.) Hiit. 48, Mer.; rediscovered in the Moelwyn mountains, near Ffestiniog, at its southernmost limit in Britain where recorded in 1690 by John Ray and in 1920 by D. A. Jones, 1962, W. M. Condry (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 64; Benoit, P. M., 1963, *Nature in Wales*, **8**, 118).

§102/2×1. Rorippa × sterilis Airy Shaw. ‡50, Denb.; without either parent on the marshy edge of the stream between Tanygraig and World's End, near Llangollen, P. M. Benoit (1964, *Nature in Wales*, **9**, 31).

§†110/1. Camelina sativa (L.) Crantz. *80, Roxburgh; Hawick rubbish-tip, E. P. **Beattie** and U. K. **Duncan.**

†112/3. Reseda alba L. 85, Fife; West Links, St. Andrews, several plants, 1962→, E. P. **Beattie** and U. K. **Duncan.**

§113/7. VIOLA LACTEA Sm. ‡25, E. Suffolk; near Great Dingle Hill, Walberswick, E. Milne-Redhead (1964, *Trans. Suffolk Nat. Soc.*, **12**, 460).

118/1. HELIANTHEMUM CHAMAECISTUS Mill. 98, Argyll; Dalmasheer, Appin, A. McG. STIRLING.

131/11. CERASTIUM PUMILUM Curt. 12, N. Hants; on chalk of spoil heaps by railway, Popham Beacons, R. A. BONIFACE and E. C. WALLACE.

§133/6. STELLARIA PALUSTRIS Retz. ‡104, N. Ebudes; Strath Suardal, east end of Loch Cill Chriosd, Skye, N. Dennis (1964, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 540).

§137/2. MINUARTIA RUBELLA (Wahlenb.) Hiern. *97, Westerness; Ben Alder hills, 3400 ft., E. C. D. TODD and D. A. WALKINSHAW.

§159/1. SALSOLA KALI L. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37). 100, Clyde Isles; sandy turf, Sliddery, Arran, P. A. CANDLISH.

168/1. GERANIUM PRATENSE L. 13, W. Sussex; in grass, etc., Roundstreet Common near Wisborough Green, J. E. SMITH and E. C. WALLACE.

§168/7. GERANIUM SANGUINEUM L. *97 (Argyll); Jurassic limestone rocks, Ormsaigbeag, Kilchoan, Ardnamurchan, A. McG. STIRLING.

§169/4. ERODIUM GLUTINOSUM Dumort. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37).

§†170/6. OXALIS ARTICULATA Savigny. ‡H.12, Wexford; in rough vegetation by the side of a road quite close to the sea and not just outside a garden, at Courtown Harbour; Rosslare, near the south side of Wexford Harbour: ‡H.38, Down; lane leading down to the sea at Glasdrumman Point, R. S. R. Fitter, all conf. D. P. Young (1964, *Irish Nat. J.*, **14**, 316).

192/10. TRIFOLIUM STRIATUM L. 85, Fife; North Queensferry, A. McG. STIRLING, *et al.*

§†203/1. CORONILLA VARIA L. *45, Pemb.; churchyard at St Govan's, near Castlemartin, Mrs. M. BARNES, comm. B. SEDDON.

206/10. VICIA SYLVATICA L. 102, S. Ebudes; Dolomite cliffs near Rubha a' Bholsa, N.E. Islay, COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA FIELD MEETING, comm. A. McG. STIRLING.

§206/15. VICIA ANGUSTIFOLIA L. *102, S. Ebudes; sand dunes, Ardnave, Islay, C.S.S.F. FIELD MEETING, comm. A. McG. STIRLING.

§†207/8. LATHYRUS LATIFOLIUS L. *44, Carm.; railway side, Burry Port, R. F. MAY, comm. B. SEDDON.

§212/11. POTENTILLA TABERNAEMONTANI Aschers. *98, Argyll; Andesite crags north of Loch Melfort, A. McG. STIRLING.

212/13×15. Potentilla × italica Lehm. 85, Fife; railway embankment, Culross, E. P. Beattie.

§220/3(9). Alchemilla glomerulans Buser. ‡64, Mid-W. York; Malham, M. E. Bradshaw (1964, *The Nat.*, **1964**, 28).

225/11. Rosa tomentosa Sm. 28, W. Norf.; hedgerow, Rockland All Saints, C. P. Petch and E. L. Swann, det. R. Melville (as var. *pseudocuspidata* (Crép.) Rouy).

§232/5(7). Sorbus rupicola (Syme) Hedl. *92, S. Aberdeen; Craig Leek, Braemar, A. McG. Stirling. *103, Mid Ebudes; cliffs near Port nam Mairbh, Loch Spelve, Mull, A. McG. Stirling and A. A. Slack.

†235/3. Sedum spurium Bieb. 85, Fife; West Links, St. Andrews, a small patch, E. P. Beattie.

§†254/6. Epilobium adenocaulon Hausskn. ‡49, Caern.; grounds of the University College Botany Dept., Bangor, P. M. Benoit; near Brithdir farm, between Bangor and Pentir; near the Primary School, Penmaenmawr, R. H. Roberts; waste ground, Portmadoc quay, P. M. Benoit and Mrs. M. D. G. Jones (1964, *Nature in Wales*, **9**, 30). ‡50, Denbigh; platform on Ruabon railway station, 1963, P. M. Benoit; damp ground by the A5 road near Conway Falls; wall at Llanrwst, R. H. Roberts (1964, *Nature in Wales*, **9**, 75). ‡52, Anglesey; Menai Bridge, on waste ground near a timber yard and in a side street, R. H. Roberts (1964, *Nature in Wales*, **9**, 75).

§†256/3. Oenothera stricta Ledeb. ex Link. *44, Carm.; on new roadside verge created by road widening, Pembrey R. F. May, comm. B. Seddon.

258/3. Circaea alpina L. 48, Mer.; shady rocky place near Corris, Mrs. D. E. M. Paish, conf. P. M. Benoit (1964, *Nature in Wales*, **9**, 72).

§261/1. Hippuris vulgaris L. *42, Brecon; Llangorse Lake in shallow water on the shore of the west bay at a place trampled by cattle, D. Davies, comm. B. Seddon.

262/2. Callitriche platycarpa Kütz. *20, Herts; river Lee, Leasy Bridge, near Wheathampstead, 1963. *30, Bedford; river Lee, Leagrave, near Luton, 1963, P. M. Benoit and J. G. Dony. *32, Northants; river Tove Towcester, 1963, P. M. Benoit, J. G. Dony and C. M. Dony. *38, Warwick; ditch near Lower Grandborough Fields Farm, near Lower Shuckburgh, 1963, P. M. Benoit and Mrs. M. D. G. Jones, conf. J. P. Savidge. *48, Mer.; deep drain by river Dysynni near Peniarth, Towyn, 1963, P. M. Benoit, but previously discovered by J. P. Savidge.

300/5. Oenanthe crocata L. 32, Northants.; banks of river Nene, Midsummer Mead, 1960; not seen in Northants. for many years, F. D. Payne (1962, *J. Northants. N.H.S. & F.C.*, **34**, 156).

§319/13. Euphorbia paralias L. *73, Kirkcudbr.; Shingle bank, Mullock Bay, H. Milne-Redhead.

320/14. Polygonum minus Huds. 48, Mer.; Mochras, in a marshy place, sparingly with *P. persicaria* and *P. hydropiper*, 1961, P. M. Benoit and M. Richards (1961, *Nature in Wales*, **7**, 169 and 172). Apparently the first certain record for Merioneth: an earlier record from Bala Lake was doubtful (see *Rep. Bot. Soc. & E.C.*, **5**, 677 (1920)). 73, Kirkcudbr.; shallow shelving shore of river Dee near Culvennan, H. Milne-Redhead.

§325/1(3). Rumex tenuifolius (Wallr.) Löve. ‡48, Mer.; dry acid fixed dunes, Morfa Harlech, 1953; Morfa Dyffryn, 1955; south side of Dysynni Broadwater, 1953; with distinctive characters but grading into *R. acetosella* auct. brit. and completely interfertile with it, P. M. Benoit (1957, Hyde, H. A. & Wade, A. E., *Welsh Flowering Plants*, ed. 2, 147; 1961, *Nature in Wales*, **7**, 97).

325/18. Rumex maritimus L. 42, Brecon; Llangorse Lake, B. Seddon (1964, *Nature in Wales*, **9**, 5).

343/21. Salix herbacea L. 48, Mer.; summit of Aran Mawddwy (2,970 ft.), one plant, 1962, A. O. Chater (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 64).

354/1. Arctostaphylos uva-ursi (L.) Spreng. 102, S. Ebudes; Margadale Hill, Bunnahabhainn, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling.

365/2×1. Limonium × neumanii C. E. Salmon. 48, Mer.; saltmarshes near Arthog, c. 6 plants with the parents, 1962 (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 64); Mochras estuary, one fine plant with the parents, P. M. Benoit.

368/1. Hottonia palustris L. 47, Montg.; Llyn Du, near Meifod, V. J. Macnair (1964, *Nature in Wales*, **9**, 4).

374/1. Samolus valerandi L. 66, Durham; marshy ground by river Tees near Dinsdale Spa, C. M. Rob.

§382/1. Centaurium pulchellum (Sw.) Druce. *73, Kirkcudbr.; sandy ground near shore, Mersehead, Southwick, H. Milne-Redhead.

385/1. Gentianella campestris (L.) Börner. 28, W. Norf.; calcareous bank, East Walton Common, B. M. Sturdy, comm. C. P. Petch and E. L. Swann. An earlier record has come to light in Herb. Petch from Derby Fen, a nearby station, C. P. Petch and E. L. Swann. 100, Clyde Isles; hillsides, Isle of Arran, P. A. Candlish.

†388/P. Phacelia tanacetifolia Benth. 16, W. Kent; weed in lettuce field, Sutton Valence, 1963, W. T. Mattingley, det. and comm. C. C. Townsend.

†392/2. Symphytum asperum Lepech. *44, Carm; roadside between Llandeilo and Talley, M. H. Sykes, det. A. E. Wade, comm. B. Seddon.

†398/1. NONEA ROSEA (Bieb.) Link. 85, Fife; West Links, St Andrews, 1962→, E. P. BEATTIE and U. K. DUNCAN.

400/4×1. MYOSOTIS CAESPITOSA × SCORPIOIDES. 20, Herts.; river Colne at Colney Heath, near St. Albans, with both parents; marshy ditch near Braughing railway station, with both parents, 1963, P. M. BENOIT and J. G. DONY and C. M. DONY. 38, Warwick; bank of canal near Lower Shuckburgh, south of Rugby, sparingly with both parents, 1963, P. M. BENOIT and Mrs. M. D. G. JONES.

401/2. LITHOSPERMUM OFFICINALE L. 98, Argyll; west side of Isle of Shuna, Craignash, A. A. SLACK and A. McG. STIRLING.

†406/p. CALYSTEGIA PULCHRA Brummitt & Heywood. 34, W. Glos.; on a fence, Westerleigh Road, Downend, D. Munro-Smith, det. R. K. Brummitt (1964, *Proc. Bristol Nat. Soc.*, **30**, 383). 59, S. Lancs.; hedgebank beside road, Reddish, 1963, J. N. MILLS.

†408/1. NICANDRA PHYSALODES (L.) Gaertn. 85, Fife; West Links, St. Andrews, a small patch, 1963, E. P. BEATTIE.

§413/3. SOLANUM NIGRUM L. *†82, Haddington; rubbish-tip, North Berwick, two small colonies, E. P. BEATTIE.

§416/1. VERBASCUM THAPSUS L. ‡†104, N. Ebudes; Dun an Aird, Skye, one plant, N. Dennis (1964, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 540).

§416/10. VERBASCUM VIRGATUM Stokes. 47, Montg.; rubbish-tip, Welshpool, Mrs. D. B. JEHU, det. B. SEDDON, comm. V. J. MACNAIR. *79, Selkirk; waste ground near Galashiels sewage works, several plants, E. P. BEATTIE conf. J. E. LOUSLEY.

†423/2. CYMBALARIA PALLIDA (Ten.) Wettst. 73, Kircudbr.; wall of ruined cottage, Howwell, Dundrennan Tank Range, H. MILNE-REDHEAD.

†428/1. ERINUS ALPINUS L. 23, Oxon.; established on old wall, Christ Church College, Oxford, 1963, R. C. PALMER.

435/1(19). EUPHRASIA ROSTKOVIANA Hayne. 98, Argyll; moor near Kilchrenan, 1920, L. V. LESTER-GARLAND (*Herb. Kew*): grassy hillside, Kilmahumaig, near Grinan, 1936, N. D. SIMPSON (*Herb. Simpson*), both det. and comm. P. F. YEO.

§440/3. OROBANCHE RAPUM-GENISTAE Thuill. *47, Montg.; Caerfawr Hill, Guilsfield, H. WEBSTER, comm. V. J. MACNAIR. 48, Mer.; rocky knoll at Llanbedr, on *Sarothamnus*, 1963, P. Helm; 1964, A. Gibson, conf. P. M. Benoit (1964, *Nature in Wales*, **9**, 73).

445/7. MENTHA ROTUNDIFOLIA (L.) Huds. 69, Westm.; Rutter Force, Holt, N. Appleby, C. M. ROB.

459/6×7. STACHYS × AMBIGUA Sm. 49, Caern.; a fine patch with *S. sylvatica* on waste ground on Portmadoc quay, P. M. Benoit and Mrs. M.

D. G. Jones (1964, *Nature in Wales*, **9**, 30). 69, Westm.; riverbank, Great Ormside, near Appleby, C. M. Rob.

†463/1. Leonurus cardiaca L. 73, Kirkcudbr.; Carrick shore, E. I. Biggar, conf. and comm. H. Milne-Redhead.

473/1. Littorella uniflora (L.) Aschers. 66, Durham; Smiddyshaw Reservoir, near Waskerley, 1960, G. A. Swan and M. Swan.

485/7. Galium sterneri Ehrend. 72, Dumfries; rocky bank of ravine, Garwald Linns, White Esk; 98, Argyll; rocky bank at head of large faulted ravine, Eas Garbh, above Barcaldine Forest, Loch Creran, H. Milne-Redhead. Basic andesite crags north of Loch Tralaig, Kilmelford, A. A. Slack and A. McG. Stirling.

†487/1. Sambucus ebulus L. 47, Montg.; roadside near Llanymynech Bridge, H. Webster, comm. V. J. Macnair.

§490/1. Linnaea borealis L. *66, Durham; See Plant Notes, p. 51.

506/2×1. Senecio × ostenfeldii Druce. 52, Anglesey; on the edge of Llangoed fen, one fine plant with the parents, P. M. Benoit (1962, *Nature in Wales*, **8**, 74).

506/4×7. Senecio × londinensis Lousley. 16, W. Kent; sandpit, Riverhead, Sevenoaks, 1963: 22, Berks.; site of factory, Abingdon, 1963, R. C. Palmer, both conf. J. E. Lousley.

506/6×7. Senecio × viscidulus Scheele. 16, W. Kent; sandpit, Riverhead, Sevenoaks, 1963, R. C. Palmer, conf. J. E. Lousley.

537/1. Carlina vulgaris L. 97, (Argyll); Jurassic limestone cliffs near Sron Beag, Kilchoan, Ardnamurchan, A. McG. Stirling.

§540/8. Cirsium dissectum (L.) Hill. ‡102, S. Ebudes; near Loch Clach a' Bhuaile, Kilchoman, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling. For an earlier record see Morton, J. K., *The Flora of Islay and Jura (v.c. 102)*, 45 (1959).

540/8×3. Cirsium × forsteri (Sm.) Loud. 102, S. Ebudes; near Loch Clach a' Bhuaile, Kilchoman, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling.

543/1. Saussurea alpina (L.) DC. 48, Mer.; Cwm Aran, Cader Idris, the southernmost British station where it was recorded in 1877 by J. Backhouse, rediscovered for the vice-county in 1960, and seen again in 1962, S. C. Clark (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 64; Benoit, P. M., 1963, *Nature in Wales*, **8**, 117). 99, Dunbarton; Ben Tharsuinn, Luss Hills, A. McG. Stirling and K. A. Beckett.

§†558/2(5). Hieracium flagellare Willd. ‡32, Northants.; Irthlingborough railway sidings, 1960, F. D. Payne (1962, *J. Northants. N.H.S. & F.C.*, **34**, 156). 84, Linlithgow; Craigton Quarry, near Whitequarries, 1963, E. P. Beattie.

§†558/2(8). Hieracium brunneocroceum Pugsl. ‡104, N. Ebudes; Portree, Skye, abundant on roadside north of the town, N. Dennis, det. P. D. Sell (1964, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 540).

§577/5. Potamogeton lucens L. ‡43, Radnor; Llanbwlehllyn Lake, B. Seddon (1964, *Nature in Wales*, **9**, 5).

§577/21. Potamogeton pectinatus L. *42, Brecon; Llangorse Lake, in water 1-4 feet deep, near Hangasty Church, B. Seddon.

§580/1. Zannichellia palustris L. ‡99 Dunbarton; boating pond, Victoria Park, Glasgow, A. McG. Stirling. For an earlier record see Lee, J. R., 1933, *Flora of the Clyde Area*, 291.—Ed.

†605/2. Juncus tenuis Willd. 55, Leics.; margins of Blackbrook Reservoir, P. A. Candlish.

§605/12. Juncus filiformis L. *55, Leics.; stony margins of Blackbrook Reservoir, P. A. Candlish, conf. T. G. Tutin.

605/26. Juncus triglumis L. 101, Kintyre; gritty flushes, Cruach Lusach, 1963, E. C. Wallace and A. G. Kenneth.

§607/8. Allium schoenoprasum L. *73, Kirkcudbr.; cliffs between Douglas Hall and Portling, E. I. Biggar, conf. and comm. H. Milne-Redhead.

§†607/10. Allium triquetrum L. H.12, Wexford; hedge bank, Killinick, R. S. R. Fitter: ‡H.38, Down, bank of a small stream near Gladsrumman Port, A. W. Stelfox, conf. R. S. R. Fitter (1964, *Irish Nat. J.*, **14**, 316).

§625/2. Epipactis helleborine (L.) Crantz. *98, Argyll; Dalnasheen, Port Appin, A. McG. Stirling, *et al.*

625/6. Epipactis phyllanthes var. vectensis (T. & T. A. Stephenson) D. P. Young. 11, S. Hants; under *Ligustrum ovalifolium* hedge, along tidal drain, Christchurch, 1963, R. P. Bowman, conf. D. P. Young.

625/7. Epipactis atrorubens (Hoffm.) Schult. 57, Derby; delete record given in *Proc. B.S.B.I.*, **4**, 430 (1962), the specimen on which the record was based has been determined as *E. helleborine* by Dr. D. P. Young, J. N. Mills.

628/1. Listera ovata (L.) R.Br. 75, Ayr; flushed ground, Kirriereoch Hill, H. Milne-Redhead.

628/2. Listera cordata (L.) R.Br. 48, Mer.; in some quantity on hummocks of *Sphagnum rubellum* amongst shrubby *Calluna* in the Ardudwy Hills, D. C. Lang (1962, *Nature in Wales*, **8**, 73). 75, Ayr; north facing hillside, Kirriereoch Hill, H. Milne-Redhead.

631/1. Hammarbya paludosa (L.) Kuntze. 48, Mer.; bog near Corris, 5 plants among *Sphagnum*, Mrs. D. E. M. Paish (1964, *Nature in Wales*, **9**, 73).

637/1. Leucorchis albida (L.) E. Mey. ex Schur. 102, S. Ebudes; limestone grassland, near Kepollsmore, Ballygrant, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling.

643/1 × 3. Dactylorhiza fuchsii × incarnata. 48, Mer.; Morfa Harlech, one plant with the parents, 1962, P. M. Benoit (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 53); again in 1963, P. M. Benoit.

643/3. Dactylorhiza incarnata (L.) Soó. 38, Warwick; near Halford, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (3), 59) (as *Dactylorchis incarnata* (L.) Vermeul.)

§652/4. Sparganium minimum Wallr. ‡44, Carm.; Bishop's Pool, Abergwili, 1963, R. F. May, conf. C. D. K. Cook. This is the first authentic record for the county. Although *Sparganium minimum* was included for Carmarthenshire in *Welsh Flowering Plants*, ed. 2, 1957, on the strength of a record by H. J. Riddelsdell from Llyn-y-Fan Fach (1901, *J. Bot.*, **38**, 344) this is actually erroneous as Riddelsdell later expressed the view that the plant was probably *Sparganium affine* (*S. angustifolium*) (1908, *J. Bot.*, **45**, 89), B. Seddon.

§653/2. Typha angustifolia L. *43, Radnor; Llanbwlchllyn Lake, B. Seddon. ‡48, Mer.; swamp on Morfa Harlech, 2 patches only, 1958, E. Milne-Redhead; 1964, P. M. Benoit; only previous Merioneth record, in *Welsh Flowering Plants*, is doubtful (1964, *Nature in Wales*, **9**, 74).

§654/3. Eriophorum latifolium Hoppe. ‡102, S. Ebudes; calcareous marsh, Ardnave Point, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling. For an earlier record see Morton, J. K., 1959, *The Flora of Islay and Jura (v.c. 102)*, 51.—Ed.

§661/1. Cladium mariscus (L.) Pohl. ‡43, Radnor; Llanbwlchllyn Lake, B. Seddon (1964, *Nature in Wales*, **9**, 4). 97, (Argyll); unnamed lochan, north-east of Kilchoan, Ardnamurchan, A. McG. Stirling. 102, S. Ebudes; Dubh Loch, near Rubha Bholsa, N.-E. Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling.

§663/16. Carex rostrata Stokes. ‡31, Hunts.; locally common at Woodwalton Fen, Thompson (1964, *Rep. Hunts. Fauna & Flora Soc.*, **16**, 6).

663/28. Carex limosa L. 75, Ayr; swampy edge of Loch Meraddie, above Glen Tig, H. Milne-Redhead.

663/33. Carex lasiocarpa Ehrh. 102, S. Ebudes; marsh near Gruinart, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling.

663/43. Carex atrata L. 89, E. Perth; limestone rocks, Glas Tulachain, 3,000 ft.; A. McG. Stirling.

§663/48. Carex aquatilis Wahlenb. ‡42, Brecon; Llangorse Lake, B. Seddon (1964, *Nature in Wales*, **9**, 5).

663/52. Carex bigelowii Torr. ex. Schwein. 48, Mer.; again near the summit of Cader Idris, 2,927 ft., the southernmost British station, where it was first discovered in 1875 by A. Ley, 1961, R. K. Brummitt; again near the summit of Aran Mawddwy, 2,970 ft., where it was discovered before 1931 by J. H. Salter, 1962, A. O. Chater (1963, Benoit, P. & Richards, M., *A Contribution to a Flora of Merioneth*, ed. 2, 65); Benoit, P. M. (1963, *Nature in Wales*, **8**, 116).

§663/54. Carex paniculata L. ‡102, S. Ebudes; near Margadale Burn, Bunnahabhainn, Islay, C.S.S.F. Field Meeting, comm. A. McG. Stirling. For an earlier record see Morton, J. K., 1959, *The Flora of Islay and Jura (v.c. 102)* 54.

§663/61. Carex arenaria L. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37).

663/81. Carex dioica L. 12, N. Hants.; refound on Bransbury Common, R. A. Boniface and E. C. Wallace.

§†676/15. Poa chaixii Vill. *14, E. Sussex; old shrubbery and shady banks in adjoining lane, east of Haywards Heath, R. C. Palmer, conf. E. F. Warburg.

682/1. Sesleria caerulea (L.) Ard. 67, Northumberland, S.; by stream running down limestone outcrop near Elsdon, G. A. Swan and M. Swan.

§685/5. Agropyron junceiforme (A. & D. Löve) A. & D. Löve. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37).

§699/1. Ammophila arenaria (L.) Link. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37).

700/1. Calamagrostis epigejos (L.) Roth. 98, Argyll; Isle of Shuna; Eilean Buidhe, Craignish, A. McG. Stirling. 101, Kintyre; near Port Lunna, Loch Sween, A. McG. Stirling and A. A. Slack.

700/2. Calamagrostis canescens (Weber) Roth. 14, E. Sussex; marshy ground in wood near Wivelsfield Green, 1963, R. C. Palmer, conf. T. G. Tutin.

§704/1. Mibora minima (L.) Desv. *41, Glam.; sandy turf, Whiteford Burrows, Gower, E. A. G. Duffey and G. T. Goodman, comm. B. Seddon.

§707/5. Phleum arenarium L. ‡†38, Warwick; railway side, Emscote, introduced with sea-sand, M. C. Clark (1964, *Proc. Birm. N.H.S.*, **20** (2), 37). 73, Kirkcudbr.; sand dunes, Mersehead, Southwick. Given as "very common" in James McAndrew's Dumfriesshire and Kirkcudbrightshire 1882 List, but apparently never localised and no dot for S.-W. Scotland in the *Atlas of the British Flora*, H. Milne-Redhead.

714/2. Parapholis incurva (L.) C. E. Hubbard. 5, S. Som.; Bossington, much trampled track merging into shingle beach, J. Rogerson.

ABSTRACTS FROM LITERATURE

Compiled by D. H. Kent

Thanks are due to E. B. Bangerter, Mrs. S. P. Phillips and W. Scott for their assistance.

SYSTEMATIC

Characeae. Corillion, R., 1962, Nouvelle contribution à l'étude des Charophycées de la péninsule ibérique et du Maroc occidental, *Bull. Soc. Sci. Bretagne*, **37**, 65-80. Systematic, ecological and distributional notes are given for new and little known species of *Chara* and *Nitella*, illustrated by habitat photos and distribution maps. *Nitella hyalina, Chara baltica, C. aspera* and *C. fragilis* are included.—[S.P.P.]

Characeae. Gillet, C., 1964, Addition à la flore charologique de l'Ardenne et des régions voisines: localités nouvelles et observations sur Nitella gracilis (Sm.) Ag., *Bull. Soc. Roy. Bot. Belg.*, **97**, 81-84. New localities in the Ardennes with pH values and depth of water, are given for *Nitella opaca, N. flexilis, N. gracilis, Chara vulgaris* and *C. fragilis.* Morphology, distribution, ecology and phytosociology are given in some detail for *Nitella gracilis,* many described forms of which, it is stated, have no real systematic value, but depend on the conditions under which the plant is developing. An illustration of the reproductive organs and terminal cells is provided.—[S.P.P.]

Tolypella glomerata (Desv.) Leonh. Pettersson, B., 1964, Notes on the ecology of Tolypella glomerata (Desv.) Leonh., *Bot. Not.*, **117**, 133-140.

1/3. Lycopodium annotinum L. Barkman, J. J., 1964, Lycopodium annotinum en Centria pinastri bij het Meeuwenveen (Zuidwolde, Dr.), *Gorteria*, **2**, 4-9. *Lycopodium annotinum,* hitherto known only from woodland habitats in the Netherlands, has been discovered in a new locality on a moist *Calluna-Erica-Molinia* heath. Details are provided of the new locality.—[D.H.K.]

4/10. Equisetum telmateia Ehrh. Sporne, K. R., 1964, Self-fertility in a prothallus of Equisetum telmateia Ehrh., *Nature*, **201**, 1345-1346.

5→ Pteropsida. Britton, D. M., 1964, Chromosome numbers of ferns in Ontario, *Canad. J. Bot.*, **42**, 1349-1354. The following chromosome numbers are reported from Canadian material:—*Asplenium viride* $n=36$, *A. trichomanes* $n=36$ and 72, *Cystopteris fragilis* $n=84$, *C. montana* $n=84$ and *Polystichum lonchitis* $n=41$.—[D.H.K.]

8/1. Pteridium aquilinum (L.) Kuhn. Watt, A. S., 1964, Some factors affecting bracken in Breckland, *J. Ecol.*, **52**, 63-77.

15. Asplenium. Lovis, J. D., 1964, Autopolyploidy in Asplenium, *Nature*, **203**, 234-325. *Asplenium ruta-muraria* and *A. septentrionale* are two distinct and well defined species which previous chromosome counts have shown to be tetraploid with $2n=72$.

A diploid form of *A. septentrionale* has been detected in material from the western Caucasus received from the Moscow Main Botanic Garden, and diploid forms of *A. ruta-muraria* have been found in northern Italy and the Dolomites. Both diploid forms are very rare. It is likely that both tetraploid *A. ruta-muraria* and tetraploid *A. septentrionale* are of autopolyploid origin.—[D.H.K.]

15. ASPLENIUM. Meyer, D. E., 1964, Über neue und seltene Asplenien Europas, *Ber. Deutsch. Bot. Ges.*, **77**, 3-13.

15/5. ASPLENIUM TRICHOMANES L. Lovis, J. D., 1964, The taxonomy of Asplenium trichomanes in Europe, *Brit. Fern Gaz.*, **9**, 147-160. *Asplenium trichomanes* subsp. *trichomanes* (subsp. *bivalens* D. E. Meyer), and subsp. **quadrivalens** D. E. Meyer emend. Lovis, recently described from Bavaria are both widespread in Europe, including the British Isles. Recently detected diploid plants from Austria, Jugoslavia and Greece are described as *A. trichomanes* subsp. *inexpectans* Lovis, subsp. nov.—[D.H.K.]

15/7. ASPLENIUM RUTA-MURARIA L. Lovis, J. D. & Reichstein, T., 1964, A diploid form of Asplenium ruta-muraria, *Brit. Fern Gaz.*, **9**, 141-146. A diploid plant of *Asplenium ruta-muraria* has been discovered in northern Italy. It is described as *A. ruta-muraria* subsp. *dolomiticum* Lovis & Reichstein, subsp. nov.—[D.H.K.]

19/2. CYSTOPTERIS DICKIEANA Sim. Dumboldt, J., 1963, Cystopteris dickieana Sim und ihr Vorkommen in den Alpen, *Ber. Bay. Bot. Ges.*, **36**, 64-66.

21. DRYOPTERIS. Gábor, V., 1963, A Dryopteris nemzetség (sensu lato) szisztematikaja, *Bot. Kozl.*, **50**, 125-133. Cytological studies on Hungarian *Dryopteris* have revealed the presence of two plants new to the Hungarian flora, viz. *D.* × *tavelii* and *D. assimilis*.—[D.H.K.]

21. DRYOPTERIS. Reichling, L., 1963, Deux fougères méconnues de la flore Portugaise: Dryopteris abbreviata (DC.) Newman et Dryopteris tavelii Rothm., *Bol. Soc. Brot.*, **37**, 35-43. Examination of specimens of *Dryopteris* from Portugal in the herbarium of the University of Coimbra has revealed the presence of *Dryopteris abbreviata* and *D.* × *tavelii* in the country. Both are new to the Portuguese flora.—[D.H.K.]

21/2×1. DRYOPTERIS × TAVELII Rothm. Vannerom, H., 1964, Dryopteris tavelii in het Belgishe gedeelte van het Kempense en Vlaamse district, *Gorteria*, **2**, 48. In the northern parts of Belgium, *Dryopteris* × *tavelii* is mostly found in young pine plantations in the Campine and Flemish districts. As some of these localities are situated near the Dutch border, the author expects that the hybrid may also occur in similar habitats in the Netherlands parts of these districts.—[Author's summary].

*21/a. DRYOPTERIS ASSIMILIS S. Walker. Walker, S. & Jermy, A. C., 1964, Dryopteris assimilis S. Walker in Britain, *Brit. Fern Gaz.*, **9**, 137-140. An account of the occurrence of *Dryopteris assimilis* on Ben Lawers, Perthshire. A description and an illustration of the species is given.—[D.H.K.]

24. THELYPTERIS. Morton, C. V., 1963, The classification of Thelypteris. *Amer. Fern J.*, **53**, 149-154.

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*See Plant Notes, p. 48.—ED.

25. Polypodium. Lloyd, R. M. & Lang, F. A., 1964, The Polypodium vulgare complex in North America, *Brit. Fern Gaz.*, **9**, 168-177.

26/1. Pilularia globulifera L. Mäkirinta, U., 1964, Über das Vorkommen von Pilularia globulifera in Finnland, *Arch. Soc. Zool. Bot. Fenn. Vanamo*, **18**, 149-159.

33/1. Pinus sylvestris L. de Ferre, Y. & Meric, J., 1963, Distinction des écotypes de Pinus sylvestris L. par l'analyse statistique des plantules, *C.R. Soc. Biogéogr.*, **39**, 15-29. The conclusions drawn from a statistical analysis of seedlings of *Pinus sylvestris* are: populations corresponding to a geographically isolated area are easy to distinguish from each other, the isolation favouring a genetic derivation the more notable when the separation is the more ancient (as in Scotland): on the other hand it is not possible to separate ecotypes on characters of seedlings in the centre of the main area.—[E.B.B.]

33/1. Pinus sylvestris L. McVean, D. N., (1963) 1964, Growth and mineral nutrition of Scots Pine seedlings of some common peat types, *J. Ecol.*, **51**, 657-670.

33/1. Pinus sylvestris L. McVean, D. N., (1963) 1964, Ecology of Scots Pine in the Scottish Highlands, *J. Ecol.*, **51**, 671-686.

37/1. Trollius europaeus L. Doroszewska. A., 1964, Tetraploid Trollius europaeus, *Acta Soc. Bot. Pol.*, **33**, 7-13. A tetraploid form of *Trollius europaeus* was produced experimentally by cross-pollinating the diploid plant ($2n=16$) with *Caltha palustris*. The tetraploid plant is described and illustrated by photographs.—[D.H.K.]

46/2. Ranunculus repens L. Cunnell, G. J., 1964, Further observations on aestivation in Ranunculus repens, *New Phyt.*, **63**, 1-11.

47. Adonis. Riedl, H., 1963, Revision der einjährigen Arten von Adonis L., *Ann. Nat. Mus. Wien*, **66**, 51-90. A revision of the annual species of *Adonis*.—[D.H.K.]

51. Paeonia. Cullen, J. & Heywood, V. H., 1964, Notes on the European species of Paeonia, *Fedde. Rep.*, **69**, 32-35.

58/1. Papaver rhoeas L. McNaughton, I. H. & Harper, J. L., 1964, Papaver rhoeas L. (Biological Flora), *J. Ecol.*, **52**, 767-779.

58/2. Papaver dubium L. McNaughton, I. H. & Harper, J. L., 1964 Papaver dubium L. (Biological Flora), *J. Ecol.*, **52**, 780-783.

58/3. Papaver lecoqii Lamotte. McNaughton, I. H. & Harper, J. L., 1964, Papaver lecoqii Lamotte (Biological Flora), *J. Ecol.*, **52**, 784-786.

58/4. Papaver hybridum L. McNaughton, I. H. & Harper, J. L., 1964, Papaver hybridum L. (Biological Flora), *J. Ecol.*, **52**, 789-793.

58/5. Papaver argemone L. McNaughton, I. H. & Harper, J. L., 1964, Papaver argemone L. (Biological Flora), *J. Ecol.*, **52**, 786-789.

61/1. Glaucium flavum Crantz. Scott, G. A. M. (1963), 1964, Glaucium flavum Crantz (Biological Flora), *J. Ecol.*, **51**, 743-754.

77. Cakile. Ball, P. W., 1964, A revision of Cakile in Europe, *Fedde. Rep.*, **69**, 35-40. Two subspecies of *Cakile maritima* are recognised in Europe, subsp. *maritima* and subsp. *baltica* (Rouy & Fouc.) Hyland, ex P. W. Ball. The subsp. *integrifolia* (Hornem.) Hyland, is considered to come within the range of variation of subsp. *maritima* and is accordingly reduced to synonymy under that subspecies.—[D.H.K.]

85/1. TEESDALIA NUDICAULIS (L.) R.Br. Newman, E. I., 1964, Factors affecting the seed production of Teesdalia nudicaulis, 1. Germination date, *J. Ecol.*, **52**, 391-404.

89. SUBULARIA. Mulligan, G. A. & Calder, J. A., 1964, The genus Subularia (Cruciferae), *Rhodora*, **66**, 127-135. North American plants of *Subularia aquatica* differ from those of Europe and Asia in shape of silicles and in other morphological characters, and are described as *S. aquatica* subsp. *americana* Mulligan & Calder, subsp. nov. The European plant is *S. aquatica* subsp. *aquatica*.

A key is provided to the identification of *S. aquatica* and its two subspecies and the African *S. monticola*.—[D.H.K.]

97. CARDAMINE. Lambinon, J. & Moutschen, J., 1963, Cardamine palustris Peterm. à 2n=64 à Chertal (Belgique), *Bull. Jard. Bot. Brux.*, **33**, 531-535. *Cardamine palustris* is said to be scattered throughout the British Isles and southern Scandinavia and to be found in central Europe, Russia, Siberia and the Atlantic side of N. America. Rare in Belgium, it was discovered at Chertal and its ecology, morphology and caryology studied. The range of its chromosome number is known to be $2n=56$, 64, 72, 78, 80 or c. 96. The population at Chertal gave $2n=64$ and appeared to be pure. The species differs from *C. pratensis* phenologically in that it flowers about a fortnight later.—[E.B.B.]

104. HESPERIS. Dvorák, F., 1964, Taxonomické Zavěry ze studia počtu chromosomu druhu rodu Hesperis L., *Preslia*, **36**, 178-184.

115/10. HYPERICUM LINARIFOLIUM Vahl. Cook, R. B. Ivimey-, (1963) 1964, Hypericum linarifolium Vahl. (Biological Flora), *J. Ecol.*, **51**, 727-732.

117→ CISTACEAE. Jean, M.-T. & Pons, A., 1963, Contribution à l'étude palynologique des Cistacées de la flore de France, *Ann. Sci. Nat.*, **4**, 159-170. Study of the pollen grains of all the species of *Cistaceae* in France indicates that *Halimium* and *Tuberaria* are autonomous genera, divisions of the genus *Cistus* as proposed by Dansereau are valid, *Helianthemum* is not divisible into sections except for *H. lavandulaefolium*, and *Fumana* should be divided into two sections. Sixteen plates give illustrations and descriptions of the pollen grains of all species.—[E.B.B.]

131. CERASTIUM. Jalas, J., 1963, Notes on Cerastium L. subsect. Perennia Fenzl (Caryophyllaceae), *Arch. Soc. Zool. Bot. Fenn. 'Vanamo'*, **18**, 57-65. The correct name for *Cerastium holosteoides* Fr. (*C. vulgatum* auct.) is shown to be **C. fontanum** Baumg. subsp. **triviale** (Link) Jalas, comb. nov.—[D.H.K.]

137. MINUARTIA. Halliday, G., 1964, Studies in the Minuartia verna complex, *Fedde. Rep.*, **69**, 8-14.

141/3. ARENARIA CILIATA L. Favarger, C., 1963, Nouvelles recherches sur les populations alpines et carpathiques d'Arenaria ciliata L. sens. lat., *Ber. Schweiz. Bot. Ges.*, **73**, 161-178. New cytological and biometrical studies have enabled the taxonomic rank of the alpine chromosome races of *Arenaria ciliata* to be more precisely determined. *A. moehringioides* Murr. is separated from *A. ciliata*, and the latter is divided into two subspecies, subsp. *tatrensis* (Zapal.) Favarger from the Tatra mountains and subsp. *bernensis* Favarger, subsp. nov., from the Bernese Alps.—[E.B.B.]

154/4. CHENOPODIUM ALBUM L. Williams, J. T., (1963) 1964, Chenopodium album L. (Biological Flora), *J. Ecol.*, **51**, 711-725.

160. SALICORNIA. Ball, P. W., 1964, A taxonomic review of Salicornia in Europe, *Fedde. Rep.*, **69**, 1-8. Tetraploid species of *Salicornia* in Europe recognised by the author are *S. nitens* Ball & Tutin (*S. ramosissima* sensu Dalby, *Proc. B.S.B.I.*, **1**, 185), *S. fragilis* Ball & Tutin (*S. stricta* auct. angl. prox. max. parte, non Dumort.) and *S. dolichostachya* Moss. *S. strictissima* Gram is reduced to a subspecies of *S. dolichostachya*.—[D.H.K.]

160/1. SALICORNIA PERENNIS Mill. Ferguson, I. K., 1964, A new station for Salicornia perennis Mill. in Ireland, *Irish Nat. J.*, **14**, 215. A further station in Co. Wexford is reported for *Salicornia perennis*. This is only the second certain record for the species in Ireland.—[D.H.K.]

169. ERODIUM. Bruggeman, C. J. M., 1964, Overzicht der in Nederland gevonden inheemse en adventieve Erodium-soorten, *Gorteria*, **2**, 49-55. *Erodium glutinosum* and *E. cicutarium* are native in the Netherlands, while *E. malacoides, E. crinitum, E. botrys, E. gruinum, E. ciconium, E. stephanianum, E. aethiopicum* and *E. moschatum* have occurred as adventives. A key is provided to the identification of the various species and line-drawings illustrate leaves and fruits.—[D.H.K.]

169. ERODIUM. Carolin, R. C., 1964, Notes on the genus Erodium L'Hér. in Australia, *Proc. Linn. Soc. New South Wales*, **88**, 313-319. *Erodium botrys* (Cav.) Bertol., *E. obtusiplicatum* (Maire, Weiller & Wilczek) J. T. Howell, *E. malacoides* (L.) Willd., *E. aureum* Carolin, *E. moschatum* (L.) L'Hérit. ex Ait. and *E. cicutarium* (L.) L'Hérit. ex Ait., all introduced species in Australia, are described and discussed. *E. aureum* is now considered to be closely related to *E. malacoides* and is unlikely to be indigenous.—[D.H.K.]

170. OXALIS. Willis, J. C. N., 1963, The fibrous-rooted Oxalis-corniculatae, *Trans. Suffolk Nat. Soc.*, **12**, 253-255. Notes on *Oxalis corniculata, O. europaea* and *O. corymbosa* in Suffolk.—[D.H.K.]

170. OXALIS. Ziegler, H., 1963, Über die Samenoberfläche von Oxalis Arten, *Ber. Bayer. Bot. Ges.*, **36**, 61-62.

170/6. OXALIS ARTICULATA Savigny. Fitter, R. S. R., 1964, Oxalis articulata in Cos. Wexford and Down, *Irish Nat. J.*, **14**, 316.

171/3. IMPATIENS PARVIFLORA DC. Hughes, A. P. & Evans, G. C., 1964, Plant growth and aerial environment, 5. The effects of (a) rooting condition and (b) red light on Impatiens parviflora, *New Phyt.*, **63**, 194-202.

189. ONONIS. Erdtmann, J., 1964, Zur Verbreitung und Taxonomie der Gattung Ononis in Nordost-Deutschland, *Fedde. Rep.*, **69**, 103-131. A taxonomic study of *Ononis* in north-east Germany. *O. spinosa* subsp. *aberrans* Erdtmann, subsp. nov., is described. It differs from subsp. *spinosa* in its broader leaves and more procumbent habit and is found in marshes and salt-marshes.—[D.H.K.]

190. MEDICAGO. Casellas, J., 1962, El género Medicago L. en España, *Coll. Bot.*, **6**, 183-291. A revision of *Medicago* in Spain.—[D.H.K.]

195. LOTUS. Jaranowski, J. & Wojciechowska, B., 1963, Cytological studies in the genus Lotus, 2. Embryology of the specific cross L. corniculatus × L. tenuifolius, *Gen. Pol.*, **4**, 277-292.

207/10. LATHYRUS JAPONICUS Willd. Brightmore, D. & White, P. H. F., (1963) 1964, Lathyrus japonicus Willd., *J. Ecol.*, **51**, 795-801.

207/S. SCORPIURUS. Van Ooststroom, S. J. & Reichgelt, T. J., 1964, De in Nederland adventief gevonden vormen van Scorpiurus muricatus L., *Gorteria*, **2**, 37-39. An account of the subspecies and varieties of *Scorpiurus muricatus* which have been found as adventives in the Netherlands. —[D.H.K.]

211/6. RUBUS IDAEUS L. Jennings, D. L., 1963, Some evidence of population differentiation in Rubus idaeus L., *J. Ecol.*, **51**, 153-157.

212. POTENTILLA. Pedersen, A., 1964, Potentilla collina, Potentilla subargentea and Potentilla subarenaria i Danmark, *Bot. Tidskr.*, **60**, 90-98.

212/1. POTENTILLA FRUTICOSA L. Elkington, T. T. & Woodell, S. R. J., (1963) 1964, Potentilla fruticosa L. (Biological Flora), *J. Ecol.*, **51**, 769-781.

220. ALCHEMILLA. Fröhner, S., 1964, Zwei Alchemilla-Probleme aus Nordeuropa, *Bot. Not.*, **117**, 33-56. *Alchemilla obtusa* Buser *sensu stricto* is considered by the author to be confined to the western Alps and the plant occurring elsewhere in Europe and passing as *A. obtusa* is described as *A. samuelssonii* Rothm. ex Fröhn. sp. nov. *A. glabra* Neygenf. *sensu stricto* is said to be confined to the Carpathians and the plant found elsewhere in Europe and passing as *A. glabra* is described as *A. suecica* Fröhn., sp. nov.—[D.H.K.]

229. CRATAEGUS. Bakker, M. J. G., 1964, Einige aantekeningen over het geslacht Crataegus L. in Nederland, *Gorteria*, **2**, 55-59. A preliminary systematic study of *Crataegus* in the Netherlands has shown the occurrence of two species—*C. monogyna* Jacq. and *C. oxyacanthoides* L., and the hybrid *C. calycina* Peterm. × *C. oxyacanthoides* L. The latter, which is found in the north-east part of Drente around wet pastures on clay soils, is new to the Dutch flora.—[D.H.K.]

235/5. SEDUM ANGLICUM Huds. Gillner, V., 1964, Sedum anglicum Huds. in planterad på Christiansö, *Bot. Not.*, **117**, 222-224. In 1963 *Sedum anglicum* was reported from four localities on the small island of Christiansö north-east of Bornholm. It is now known that the species was deliberately introduced there about forty years ago.—[D.H.K.]

235/3. SEDUM ACRE L. Priszter, S. & Téfényi, P., 1963, A Sedum acre L. váltazatossága, *Bot. Kozl.*, **50**, 67-78. Studies on variation in populations of *Sedum acre* in Hungary. Comparisons are made also with material from other countries.—[D.H.K.]

235/10. SEDUM FORSTERANUM Sm. Roberts, R. H., 1964, A note on the Cardiganshire localities of Sedum forsteranum Sm., *Nature in Wales*, **9**, 19-21.

246. RIBES. Goldschmidt, E., 1964, Cytologische Untersuchungen an diploidea Arten und Arthybriden der Gattung Ribes L., *Heriditas*, **51**, 146-186.

254/13. EPILOBIUM NERTERIOIDES Cunn. Stelfox, A. W., 1964, The arrival of Epilobium nerterioides Cunningham in the Mourne area of Co. Down, *Irish. Nat. J.*, **14**, 215. Notes on the colonisation of various localities in the Mourne area of Co. Down by *Epilobium nerterioides*.—[D.H.K.]

262/h. CALLITRICHE HAMULATA Kütz. Scannell, M. J. P., 1964, Callitriche hamulata Kütz. in Cork East, *Irish Nat. J.*, **14**, 215

263/1. VISCUM ALBUM L. Almquist, E., 1964, Ar misteln inhemsk i Sverige?, *Svensk Bot. Tidskr.*, **58**, 320-336. The problem as to whether

Viscum album is native or introduced in Sweden is reviewed and discussed. —[D.H.K.]

317/1. ARISTOLOCHIA CLEMATITIS L. Holubová, A. & Slaviková, Z., 1964, Aristolochia clematitis na území cssr, *Preslia*, **36**, 294-305. Studies on the distribution of *Aristolochia clematitis* in Czechoslovakia.—[D.H.K.]

318/2. MERCURIALIS ANNUA L. Durand, B., 1963, Le complexe Mercurialis annua L. s.l. Une étude biosystématique, *Ann. Sci. Nat. Bot.*, **4**, 625-736. The final chapters in this detailed study are given to dealing with the general characters of the diploid cytotype and the characters and origin of the polyploids. Polyploidy is said to be a genetic mechanism of adaptation to a very short annual biological cycle. Particular attention is given to the variation in forms of inflorescence.—[E.B.B.]

319. EUPHORBIA. Kuzmanov, B., 1964, On the origin of Euphorbia subg. Esula in Europe (Euphorbiaceae), *Blumea*, **12**, 369-379.

320. POLYGONUM. Ito, K., 1964, Polygonum aviculare and its allies in Hokkaido, the Kuriles and Sakhalin, *J. Jap. Bot.*, **39**, 65-78.

320/3. POLYGONUM MARITIMUM L. Beeftink, W. G., 1964, Polygonum maritimum L. in Nederland, *Gorteria*, **2**, 13-20. The discovery in 1962 of a single specimen of *Polygonum maritimum* on drift material washed ashore at the north coast of the island of Noord-Beveland, Netherlands, is discussed. This is the first reported occurrence of *P. maritimum* in the country and its taxonomic, geographic and ecological characteristics are reviewed.—[D.H.K.]

325/2. RUMEX ACETOSA L. Sděleni, K., 1964, Sex chromatin in Rumex acetosa L., *Preslia*, **36**, 422-424.

325/11. RUMEX CRISPUS L. Cavers, A. B. & Harper, J. L., 1964, Rumex crispus L. (Biological Flora), *J. Ecol.*, **52**, 754-766.

325/12. RUMEX OBTUSIFOLIUS L. Cavers, A. B. & Harper, J. L., 1964, Rumex obtusifolius L. (Biological Flora), *J. Ecol.*, **52**, 737-754.

335/2. BETULA PUBESCENS Ehrh. England, F. J. W., 1964, Leaf length variation in Betula pubescens, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 542.

336. ALNUS. Edlin, H. L., 1964, A modern sylva or a discourse of forest trees, 11. Alder-Alnus species, *Quart. J. For.*, **58**, 302-310.

341. QUERCUS. Cousens, J., 1964, Introgression among the British oaks, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 542.

341/4. QUERCUS PETRAEA (Mattuschka) Liebl. Jarvis, P. G., 1964, The adaptibility to light intensity of seedlings of Quercus petraea (Matt.) Liebl., *J. Ecol.*, **52**, 545-571.

343. SALIX. Rechinger, K. H., 1963, Zur Kenntnis der europäischen Salix Arten, *Österr. Bot. Zeitschr.*, **110**, 338-341. **Salix hibernica** Reching. f., sp. nov. is described from Ben Bulben, Ireland. It had hitherto been confused with *S. phylicifolia*.

Salix purpurea var. *lambertiana* (Sm.) Koch is raised to subspecific rank as **S. purpurea** subsp. **lambertiana** (Sm.) Reching. f.—[D.H.K.]

345/1. RHODODENDRON PONTICUM L. Anon., 1964, Immigrant troubles that grow fast, *The Times*, 30th June 1964, 12. Discusses the spread of *Rhododendron ponticum* in forestry areas where it sometimes becomes a serious pest.—[D.H.K.]

356/1. Calluna vulgaris (L.) Hull. Cormack, E. & Gimingham, C. H., 1964, Litter production by Calluna vulgaris (L.) Hull, *J. Ecol.*, **52**, 285-297.

356/1. Calluna vulgaris (L.) Hull. Fearnside, W. G., 1964, Occurrence of bicoloured heather on Burbage Moor, *The Nat.*, **1964**, 32. Records the occurrence of a plant of *Calluna vulgaris* with individual branches bearing purple-pink and white flowers. Similar occurrences from other parts of Britain are also mentioned.—[D.H.K.]

357. Erica. Dulfer, H., 1963, Bemerkungen über einige Linnésche Erica-Arten, *Bot. Jahrb.*, **82**, 429-434.

357/2. Erica mackaiana Bab. Lamb, J. G. D., 1964, On the possible occurrence of Erica mackaiana Bab. in Co. Mayo, *Irish Nat. J.*, **14**, 213-214. The discovery of colonies of *Erica* × *praegeri* (*E. mackaiana* × *tetralix*) at Portacloy, Co. Mayo, suggests that the former parent, as yet unrecorded in the vice-county, awaits discovery.—[D.H.K.]

365. Limonium. Pignatti, S., 1962, Studi sui Limonium, 5. Note sulla sistematica delle specie iberiche di Limonium, *Coll. Bot.*, **6**, 293-330.

369. Cyclamen. Schwarz, O., 1964, Systematische Monographie der Gattung Cyclamen, 2, *Fedde. Rep.*, **69**, 73-103.

372. Anagallis. Sverepová, G., 1964, Anagallis × doerfleri Ronn., *Preslia*, **36**, 289-293. Experimental studies on *Anagallis arvensis* L. var. *arvensis*, *A. foemina* Mill., and the hybrid between them.—[D.H.K.]

382. Centaurium. Zeltner, L., 1963, Recherches sur quelques taxa méditerranéens du genre Centaurium Hill (Gentianacées), *Bull. Soc. Neuchat. Sci. Nat.*, **86**, 93-100. The chromosome numbers of *Centaurium majus*, *C. hermanni* and *C. tenuiflorum* are reported for the first time. *C. majus*, an Iberian endemic, is a diploid with $n=10$. *C. hermanni* is related by its morphology and chromosome number ($n=10$) to *C. tenuiflorum*. Cytological studies contradict the supposedly hybrid origin of *C. tenuiflorum* from *C. minus* (diploid or tetraploid) and *C. pulchellum* (hypotetraploid). *C. pulchellum* has been found at Mora de Ebro, Province of Tarragona, Spain. The distribution of this species appears to be in the interior where it may replace *C. tenuiflorum*.—[Author's summary, p.p.].

384/2. Gentiana verna L. Elkington, T. T., (1963) 1964, Gentiana verna L. (Biological Flora), *J. Ecol.*, **51**, 755-767.

386/1. Menyanthes trifoliata L. Hewett, D. G., 1964, Menyanthes trifoliata L. (Biological Flora), *J. Ecol.*, **52**, 723-735.

400/6. Myosotis alpestris Schmidt. Elkington, T. T., 1964, Myosotis alpestris Schmidt (Biological Flora), *J. Ecol.*, **52**, 709-722.

402/1. Mertensia maritima (L.) Gray. Scott, G. A. M., (1963) 1964, Mertensia maritima (L.) S. F. Gray (Biological Flora), *J. Ecol.*, **51**, 733-742.

406. Calystegia. Bangerter, E. B., 1964, A survey of Calystegia in the London Area. Second Progress Report, 1963, *Lond. Nat.*, **43**, 23-24.

407/1. Ipomoea. Matuda, E., 1963, El género Ipomoea en México, *An. Inst. Biol. Univ. México*, **34**, 85-145. Describes the species of *Ipomoea* found in Mexico and gives a key to their identification. Some of the species have occurred as adventives in Britain.—[D.H.K.]

409. Lycium. Feinbrun, N. & Stearn, W. T., 1964, Typification of Lycium barbarum L., L. afrum L. and L. europaeum L., *Israel J. Bot.*, **12**,

114-123. Application of the name *Lycium barbarum* L. to species as diverse as *L. halimifolium* Miller, *L. shawii* Roem. & Schultes and *L. depressum* Stocks has made it necessary to determine Linnaeus's original usage and intent in the *Species Plantarum* (1753). Dissection of a flower of the specimen (*Linnean Herb.*, 259, 6) accepted as the type of *L. barbarum* shows that this has the filaments of the stamens densely hairy at base, and confirms Pojarkova's opinion that the name **L. barbarum** should be used for the Chinese species known as *L. halimifolium*. This was introduced in European gardens in the mid-18th century, probably by Pierre d'Incarville, and is now extensively naturalised in Europe.

Linnean material (*Linn. Herb.*, 259, 7) of *L. europaeum* L. has the corolla-tube hairy below the filaments. This character is apparently variable within the species. Hence *L. orientale* Miers is regarded as conspecific with *L. europaeum*.

The Linnean material of *L. barbarum* and *L. europaeum* is described and the relevant synonymy of these and of *L. afrum* L., *L. depressum* Stocks and *L. shawii* Roem. & Schultes is given.

A translation into English of Pojarkova's key (1955) to the species of the U.S.S.R. is also given.—[Authors' summary.]

415/1. DATURA STRAMONIUM L. Raud, G., 1963, Organographie de la capsule du Datura stramonium L., *Bull. Soc. Bot. France*, **110**, 216-237. A detailed study of the capsule of *Datura stramonium*, illustrated by many photographic figures.—[E.B.B.]

426/1. LIMOSELLA AQUATICA L. Londo, G., 1964, Limosella aquatica L. in de duinen bij Zandvoort, *Gorteria*, **2**, 1-4. In the Netherlands *Limosella aquatica* is usually found on river banks. Details are given of a new locality for the species in a dune area near Zandvoort.—[D.H.K.]

430. VERONICA. Bangerter, E. B., 1964, Some speedwells of the Breckland. *Countryside*, **20**, 7-9. Notes on *Veronica spicata*, *V. triphyllos*, *V. verna* and *V. praecox* in East Anglia.—[D.H.K.]

440. OROBANCHE. Vann der Land, J., 1964, Een Orobanche als graanadventief, *Gorteria*, **2**, 22-24. An *Orobanche* species growing on *Matricaria matricarioides* was collected near a grain warehouse at Rotterdam harbour in 1935. The specimen was originally identified as *O. minor* Sm., but upon closer examination appears to be *O. cernua* Loefl. This is the first time that a species of this genus has been found as an alien in the Netherlands.—[Author's summary].

460/1. BALLOTA NIGRA L. Crespo, S., 1962, Ballota nigra una Labiada nueva para la flora Argentina, *Darwiniana*, **3**, 523-527. An examination of herbarium material has revealed the presence of *Ballota nigra* as an adventive in Argentina. In recent years the species has apparently become more widespread and three varieties have been noted—viz. var. *nigra*, var. *foetida* (Lam.) Koch and var. *velutina* (Pospich) Fiori.—[D.H.K.]

461/1. GALEOBDOLON LUTEUM Huds. Dersch, G., 1963, Zur Cytologie and Taxonomie der Goldnessel (Lamium galeobdolon (L.) L.), *Ber. Deutsch. Bot. Ges.*, **76**, 351-359. Three subspecies of *Lamium galeobdolon* are recognised in Europe, viz. subsp. *galeobdolon*, $2n=18$, subsp. *flavidum*, $2n=18$ and subsp. *montanum*, $2n=36$.—[D.H.K.]

472/1. PLANTAGO MAJOR L. Sagar, G. R. & Harper, J. L., 1964, Plantago major L. (Biological Flora), *J. Ecol.*, **52**, 189-205.

472/2. PLANTAGO MEDIA L. Sagar, G. R. & Harper, J. L., 1964, Plantago media L. (Biological Flora), *J. Ecol.*, **52**, 205-210.

472/3. PLANTAGO LANCEOLATA L. Sagar, G. R. & Harper, J. L., 1964, Plantago lanceolata L. (Biological Flora), *J. Ecol.*, **52**, 211-221.

475. CAMPANULA. Bielawska, H., 1964, Cytogenetic relationships between lowland and montane species of the Campanula rotundifolia L. group 1. C. cochlearifolia Lam. and C. rotundifolia L., *Acta Soc. Bot. Pol.*, **33**, 15-44.

475. CAMPANULA. Podlech, D. & Damboldt, J., 1963, Zytotaxonomische Beiträge zur Kenntnis der Campanulaceen in Europa, *Ber. Deutsch. Bot. Ges.*, **76**, 360-369.

502. BIDENS. Debray, M., 1963, Les espèces du genre Bidens introduites en France. Morphologie et géographie, *Cahiers des Nat.*, **19**, 33-50. A lengthy and detailed key, illustrated by diagrams of achenes and leaf-shape, is provided to determine the native and introduced species of *Bidens* in France. Notes on the critical characters and distribution of the species *B. connata* Mühl., *B. comosa* (Gray) Wiegand, *B. frondosa* L., *B. vulgata* Greene, *B. aurea* Ait., *B. pilosa* L. and *B. bipinnata* L. follow.—[E.B.B.]

502/3. BIDENS FRONDOSA L. Hejný, S. & Lhotská, M., 1964, Zu der Art der Ausbreitung vons Bidens frondosa L. in die Teichgebiete der Tschechoslowakie, *Preslia*, **36**, 416-421. The introduction of the N. American species *Bidens frondosa* into Czechoslovakia and its subsequent spread along the riversides in that country is discussed.—[D.H.K.]

504. AMBROSIA. Payne, W. W., 1964, A re-valuation of the genus Ambrosia, *J. Arnold Arb.*, **45**, 401-438.

506/4. SENECIO SQUALIDUS L. Kent, D. H., 1963, Senecio squalidus L. in the British Isles—7, Wales, *Nature in Wales*, **8**, 175-178. The historical spread of *Senecio squalidus* in Wales is described and discussed.—[D.H.K.]

506/4. SENECIO SQUALIDUS L. Kent, D. H., 1964, Senecio squalidus L. in the British Isles—9, Ireland, *Irish Nat. J.*, **14**, 203-204. The history and spread of the south European species *Senecio squalidus* in Ireland is outlined and discussed. The present Irish vice-comital distribution is H.3-5 [7, 10], 14, [19], 20, 21 and 39*.—[D.H.K.]

506/8. SENECIO VULGARIS L. Allen, H. G., 1962, Spread of the rayed groundsel (Senecio vulgaris L. var. radiatus Koch) in Northamptonshire, *J. Northants. N.H.S. & F.C.*, **34**, 138-139.

506/10. SENECIO SMITHII DC. Bullard, E. R., 1964, Planticru Herbs and Alien Plants in Orkney, 5. Smith's Senecio, *The Orcadian*, 1 October 1964. *Senecio smithii*, a native of Tierra del Fuego, Chile, and the Falkland Islands, is commonly seen in Orkney and Shetland in waste places and beside ditches and burnsides. To the visitor to northern Scotland it may appear to be a well naturalised adventive but the writer points out that in almost every place that she knows it the species has been deliberately planted. It seems unlikely also that *S. smithii* sets viable seed in Britain though it would be possible for it to spread vegetatively by portions of root being broken away and carried downstream to root in mud at some lower point.

The introduction of the species into Orkney and Shetland is discussed, it may have been brought to Shetland by someone who had been shepherding in the Falklands, or by Shetland or Orkney whalers calling at the Falklands on their way home from the Antarctic, or it may merely have been introduced as a garden plant.—[D.H.K.]

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*See Plant Notes, p. 51.—ED.

506/17. SENECIO INTEGRIFOLIUS (L.) Clairv. Brunerye, L., 1963. Mise au point sur les rapports entre Senecio integrifolius Clairv. de Grande Bretagne et Senecio spathulaefolius DC. de Normandie, *Bull. Mus. Nat. Hist. Nat. Paris*, **35**, 315-319. After a study of many herbarium specimens the author confirms that *Senecio integrifolius* of Great Britain and *S. spathulifolius* of Normandy are two distinct species, each with a variety in these areas; var. *candida* Corb. for the latter and var. *maritimus* Clapham for the former. A certain number of characters to differentiate these species and varieties are defined.—[Author's summary.]

506/17(2). SENECIO SPATHULIFOLIUS Turcz. Smith, U. K., 1964, The occurrence of Senecio spathulifolius in northern England, *The Nat.*, **1964**, 157-158. The history of the records of the occurrence of *Senecio spathulifolius*, or *S. integrifolius* var. *maritimus* Clapham, in northern England, particularly in the Mickle Fell area is given. There appears to be doubt as to the correct name of the northern plant. A careful search in the Mickle Fell district failed to rediscover the plant which has not been seen for some years.—[D.H.K.]

509. PETASITES. Sorenson, T. & Christiansen, H., 1964, Contribution to the chromosome cytology of Petasites, *Bot. Tidsskr.*, **59**, 311-314. Counts made on material of *Petasites* include *P. fragrans* $2n=$c. 60 and *P. japonicus* $2n=87$.—[D.H.K.]

521. ERIGERON. Van Ooststroom, S. J. & Reichgelt, T. J., 1964, Erigeron L. sectie Phalacroloma (Cass.) Cronquist in Nederland, *Gorteria*, **2**, 9-12. Dutch Floras refer to two species of *Erigeron* section *Phalacroloma* as being found as adventives in the Netherlands, viz. *E. annuus* (L.) Pers. and *E. strigosus* Muhl. ex Willd. A study of herbarium material suggests that only *E. strigosus* has occurred. Most of the material studied belonged to *E. strigosus* var. *septentrionalis* (Fern. & Wieg.) Fern., but some specimens referable to *E. strigosus* var. *beyrichii* (Fisch. & Mey.) A. Gray were seen. A key is provided to the varieties of *E. strigosus*.—[D.H.K.]

533/2. CHRYSANTHEMUM LEUCANTHEMUM L. Favarger, C., 1963, Sur la présence de chromosome B dans l'espèce collective Chrysanthemum leucanthemum L., *Bull. Soc. Neuchat. Sci. Nat.*, **86**, 101-106. In ten specimens of the collective species *C. leucanthemum* L. the author has discovered in the root cells 1-3 supernumerary chromosomes. The latter are about half the size of normal chromosomes and are heterobrachial, the centromere being sub-median. They appear to be euchromatic. They have not been seen in diploids but only in polyploids where they occur about twice as frequently in hexaploids as in tetraploids.—[Author's summary.]

535. ARTEMISIA. Ehrendorfer, F., 1964, Notizen zur Cytotaxonomie und Evolution der Gattung Artemisia, *Österr. Bot. Zeitschr.*, **111**, 84-142.

558. HIERACIUM. Sell, P. D. & West, C., 1964, Hawkweeds in Kent, *Bull. Kent F.C.*, **9**, 9-14. A key is provided for the identification of the *Hieracium* species to be found in Kent.—[D.H.K.]

558/2(5). HIERACIUM FLAGELLARE Willd. Payne, F. D., 1962, Hieracium flagellare (Willd.) at Irthlingborough, *J. Northants. N.H.S. & F.C.*, **34**, 156. Records the discovery of *Hieracium flagellare* by the railway at Irthlingborough, Northants. It is believed to have originated from seed carried along the railway from known colonies at Hanslope, Bucks.—[D.H.K.]

563. ALISMA. Pogan, E., 1963, Rangu systematyczna Alisma subcordatum Raf. i Alisma triviale Pursh, *Acta Bot. Cracov.*, **6**, 135-20[illegible]. Studies on the American taxa included in the *Alisma plantago-aquatica* complex. *A. subcordatum* Raf., $2n=14$, and *A. triviale* Pursh, $2n=28$, were found to be distinct from *A. plantago-aquatica* L. sensu stricto, and should be retained as species.—[D.H.K.]

566/1. BUTOMUS UMBELLATUS L. Witmer, S. W., 1964, Butomus umbellatus L. in Indiana, *Castanea*, **29**, 117-118. *Butomus umbellatus* is reported from Indiana, and its history, spread and distribution as an adventive in N. America are outlined.—[D.H.K.]

569/1. EGERIA DENSA Planch. Corillion, R., 1964, Elodea densa (Planch.) Casp. ((Hydrocharitacée)=Egeria densa Planch.) en Bretagne, *Bull. Soc. Sci. Bretagne*, **37**, 81-84. *Egeria densa*, a S. American aquatic, has become naturalised in the valley of the Erdre (Loire), causing obstruction to navigation. Two other alien species of *Elodea* occur in north-west France and the following key is provided to distinguish them:—

Leaves in whorls of 3, short (5-10 mm.); flowers pinkish-white, small (4-7 mm.) in diameter, solitary in spathe .... *E. canadensis*
Leaves usually in whorls of 4, long (10-30 mm.); flowers white, large (male reaching 20 mm. in diameter), 2-3 in spathe .... *E. densa*
Vegetative characters approaching the above, but leaves recurved and ± inrolled below .... *E. crispa**
—[E.B.B.]

577/16. POTAMOGETON TRICHOIDES Cham. & Schlecht. Van Ooststroom, S. J. & Reichgelt, T. J., 1964, Over het voorkomen van Potamogeton trichoides in Nederland, *Gorteria*, **2**, 12.

600/1. ENDYMION NON-SCRIPTUS (L.) Garcke. Knight, G. H., 1964, Some factors affecting the distribution of Endymion nonscriptus (L.) Garcke in Warwickshire woods, *J. Ecol.*, **52**, 405-421.

605. JUNCUS. De Fillips, R. A., 1964, A taxonomic study of Juncus in Illinois, *Amer. Midl. Nat.*, **71**, 296-319. Describes, and provides a key to, the 22 species of *Juncus* found in Illinois. *J. gerardi* is newly recorded from the State while *J. articulatus* is strangely absent.—[D.H.K.]

605. JUNCUS. Edgar, E., 1964, The leafless species of Juncus in New Zealand, *New Zeal. J. Bot.*, **2**, 177-204. The author describes and provides a key to the identification of the ten indigenous rushes of the subgenus *Genuini*, and four introduced species—*J. effusus, J. conglomeratus, J. inflexus* and *J. subsecundus*. Some of the species mentioned have occurred in Britain as wool adventives.—[D.H.K.]

605/7. JUNCUS BUFONIUS L. Shah, C. K., 1963, The life history of Juncus bufonius Linn., *J. Indian Bot.*, **42**, 238-251.

606. LUZULA. Chrtek, J. & Kriša, B., 1964, On the problems of the species "Luzula spicata" (L.) DC. in Italy, *Webbia*, **19**, 1-10. Examination of herbarium material has shown that in Italy the *Luzula spicata* complex is represented by three species—*L. spicata, L. bulgarica* and *L. pindica,* of which the first is divided into two subspecies—subsp. *spicata* and subsp. *mutabilis.*

*This probably refers to *Lagarosiphon majus*.—ED.

The most frequent plant is *L. spicata* subsp. *mutabilis* which is widespread in the Alps. *L. spicata* subsp. *spicata* is much rarer and is found in the northern parts of the Appenines. *L. bulgarica* occurs in central Italy while *L. pindica* is found in the southernmost parts of the Appenine peninsula.—[D.H.K.]

606. LUZULA. Nordenskiöld, H., 1964, The effect of x-irradiation on diploid and polyploid Luzula, *Hereditas*, **51**, 344-374.

607/10. ALLIUM TRIQUETRUM L. Fitter, R. S. R. & Stelfox, A. W., 1964, Allium triquetrum L. in Ireland, *Irish Nat. J.*, **14**, 316. Gives records of *Allium triquetrum* from Co. Wexford and Co. Down.—[D.H.K.]

607/12. ALLIUM URSINUM L. Clappuz, J.P. & Esculier, R., 1963, Contribution à l'étude d'une liliacée : Allium ursinum L. et ses variations, *Bull. Soc. Linn. Lyon.*, **1963**, 228-235. Abnormalities in the floral structure of a number of specimens of *Allium ursinum* are described, discussed and illustrated by diagrams.—[E.B.B.]

615/1. SISYRINCHIUM BERMUDIANA L. Mange, M. & Melin, D., 1963, Une station de Sisyrinchium bermudianum L. aux environs de Besançon, *Bull. Soc. Hist. Nat. Doubs*, **65**, 65-66. *Sisyrinchium bermudiana* was first known in France about 1900 and has been recorded in several Departments since. In 1963 it was found at Besançon. It may have been introduced through the agency of American troops and supplies during both World Wars.—[E.B.B.]

625/2. EPIPACTIS HELLEBORINE (L.) Crantz. Hansen, A., 1964, Epipactis helleborine var. neerlandica i Danmark, *Bot. Tidsskr.*, **59**, 334-337.

626/1. EPIPOGIUM APHYLLUM Sw. Paul, V. N., 1964, Epipogium aphyllum, *Reading Nat.*, **16**, 29-30. The author reports the reappearance in 1963 of *Epipogium aphyllum* in an undisclosed locality where she first found the plant in 1931. It was seen again in 1933 and 1953.—[D.H.K.]

631/1. HAMMARBYA PALUDOSA (L.) Kuntze. Smith, G., 1964, Hammarbya paludosa on Rhum, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 539. Reports a second locality for *Hammarbya paludosa* on the island of Rhum.—[D.H.K.]

643. DACTYLORHIZA. Hawkes, J. G. & Readett, R. C., 1964, A colony of marsh orchids in south Warwickshire, *Proc. Birm. N.H.S.*, **20** (3), 59.

643. DACTYLORHIZA. Willis, J. C. N., 1963, Dactylorchis ericetorum Linton and other records, *Trans. Suffolk Nats. Soc.*, **12**, 256-257. Gives a number of notes on Suffolk species of *Dactylorhiza* including *D. praetermissa, D. fuchsii* and *D. maculata* subsp. *ericetorum.* The following hybrids have recently been found in the county—*D. fuchsii* × *praetermissa* and *D. fuchsii* × *maculata* subsp. *ericetorum.*

Coeloglossum viride and *Gymnadenia conopsea* still occur in Suffolk but both species are now very rare.—[D.H.K.]

650/2. LEMNA TRISULCA L. Weislo, H., 1963, Obserwacje nad klonami Lemna trisulca L. w warnukach hodowli aseptycznej, *Acta Biol. Cracov.*, **6**, 161-176.

651/1. WOLFFIA ARRHIZA (L.) Hork. ex Wimm. Jager, E., 1964, Zur Deutung des Arealbildes von Wolffia arrhiza (L.) Wimm. und einiger anderer ornithochorer Wasserpflanzen, *Ber. Deutsch. Bot. Ges.*, **77**, 101-111.

660/2. RHYNCHOSPORA FUSCA (L.) Ait. f.—See 663. CAREX.

663. CAREX. Benoit, P. M., 1963, Two rare sedges discovered in Merioneth, *Nature in Wales*, **8**, 147-154. Reports the discovery of *Carex*

paupercula Michx. and *Rhynchospora fusca* (L.) Ait. f. in Merioneth. Details of habitats and associated species are given and line drawings of the two species are provided.—[D.H.K.]

663. CAREX. Kjellqvist, E. & Löve, A., 1963, chromosome numbers of some Carex species from Spain, *Bot. Not.*, **116**, 241-248. Counts made on Spanish carices include *Carex pendula* $2n=58$, *C. distans* $2n=74$, *C. flacca* $2n=90$, *C. divisa* $2n=60$, *C. divulsa* $2n=58$, *C. paniculata* $2n=60$ and *C. leporina* $2n=64$.—[D.H.K.]

663. CAREX. Moore, R. J. & Calder, J. A., 1964, Some chromosome numbers of Carex species of Canada and Alaska, *Canad. J. Bot.*, **42**, 1387-1391. Chromosome numbers are reported for 36 species and 2 hybrids in Canadian Carex. *C. flava* from Ontario had $2n=36$ and *C. magellanica* from British Columbia $2n=$c. 60.—[D.H.K.]

663/75. CAREX CRAWFORDII Fern. Held, H. den & Kortselius, J., 1964, Carex crawfordii Fern. weer in Nederland, *Gorteria*, **2**, 21-22. *Carex crawfordii*, a N. American species, has been found as an adventive near Vegel, Prov. Noord-Brabant. This is the second occurrence of this sedge, which is illustrated by a line-drawing, in the Netherlands.—[D.H.K.]

664→ GRAMINEAE. Auquier, P., 1963. Critères anciens et modernes dans la systématique des germinées, *Nat. Mosana*, **16**, 1-63.

664→GRAMINEAE. Bradshaw, A. D., Chadwick, M. J., Jowett, D. & Snaydon, R. W., 1964, Experimental investigations into the mineral nutrition of several grass species, *J. Ecol.*, **52**, 665-676.

664→GRAMINEAE. Scholz, H., 1964, Zur Gramineen flora mitteleuropas, 2, *Ber. Deutsch. Bot. Ges.*, **77**, 145-160.

664→ GRAMINEAE. Tran Thi Tuyet Hoa, 1963, Sur l'existence de deux catégories histologiques de ligules "nerviées" chez les Graminées, *Bull. Soc. Bot. France*, **110**, 204-209. Two distinct types of nerves occur on the ligules of grasses. One type of ligule (e.g. in *Ammophila arenaria*) has true nerves comparable with those of blade and sheath; the other (e.g. *Poa trivialis, Avena fatua*) has nerve-like thickenings of sclerenchymatous nature.—[E.B.B.]

667/1. MOLINIA CAERULEA (L.) Moench. Gore, A. J. P., 1963, Factors limiting plant growth on high-level blanket peat, 3. An analysis of the growth of Molinia caerulea (L.) Moench in the second year, *J. Ecol.*, **51**, 481-491.

670. FESTUCA. Duyfjes, B. E. E. de Wilde, 1964, Festuca ovina L., s.l. en Festuca rubra L., s.l. in Nederland, *Gorteria*, **2**, 40-48. Four species of the *Festuca ovina—F. rubra* groups are recognised in the Netherlands, viz. *F. ovina* L., *F. trachyphylla* (Hack.) Kraj., *F. heterophylla* Lamk. and *F. rubra* L.

Three subspecies of *F. ovina* are recognised—subsp. *ovina*, subsp. *tenuifolia* (Sibth.) Čelak. and subsp. **cinerea** (Vill.) Duyfjes, comb. nov. (*F. duriuscula* L., *F. longifolia* Thuill.). *F. rubra* has two subspecies, subsp. *rubra* and subsp. *juncifolia* (St. Amans) R. Lit.

All taxa are believed to be native with the exception of *F. heterophylla* which is probably introduced with grass seed.—[D.H.K.]

670. FESTUCA. Holmen, K., 1964, Cytotaxonomical studies in the Arctic Alaskan flora. The genus Festuca, *Bot. Not.*, **117**, 109-119. Studies on the Arctic-Alaskan species of *Festuca*, some of which also occur in Britain. A key is provided to the identification of the various species.—[D.H.K.]

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(Zucc.) Trotter, *Guizotia schimperi* Schultz-Bip., *Kochia scoparia* subsp. *densiflora* (Turcz.) Aell. and *Polygonum divaricatum* L.—[D.H.K.]

HANSEN, A., 1964, Nye floristiske fund og iagttagelser, mest fra 1963, *Bot. Tidsskr.*, **59**, 340-344. Gives records of a number of interesting Danish plants found mostly in 1963.—[D.H.K.]

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LÖVE, A. & SOLBRIG, O. T., 1964, IOPB Chromosome number reports, 1, *Taxon*, **13**, 99-110. Chromosome counts are given for a number of N. American plants, including *Asplenium ruta-muraria* × *trichomanes*, $2n=$c. 144; *A. trichomanes*, $n=36$ & 72; *Polystichum lonchitis*, $n=41$; *Dryopteris filix-mas*, $n=82$; *Butomus umbellatus*, $2n=26$; *Agrostis gigantea*, $2n=42$; *Alopecurus aequalis*, $2n=14$; *Asparagus officinalis*, $2n=20$; *Polygonum viviparum*, $2n=120$; *Atriplex hastata*, $2n=18$; *Axyris amaranthoides*, $2n=18$; *Ranunculus trichophyllus*, $2n=18$; *Anaphalis margaritacea*, $2n=28$; *Bidens cernua*, $2n=24$ and *B. frondosa*, $2n=48$.—[D.H.K.]

NEWMAN, E. I., (1963) 1964, Factors controlling the germination date of winter annuals, *J. Ecol.*, **51**, 625-638. Studies on the germination of winter annuals, in particular *Teesdalia nudicaulis* and *Aira praecox*.—[D.H.K.]

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Skalínska, M., et al., 1964, Additions to chromosome numbers of Polish angiosperms (fifth contribution), *Acta Soc. Bot. Pol.*, **33**, 45-76. Newly reported chromosome numbers for Polish angiosperms include *Honkenya peploides*, $2n=48$; *Draba aizoides*, $2n=16$; *Thlaspi arvense*, $2n=14$; *Sarothamnus scoparius*, $2n=46$; *Eryngium campestre*, $2n=14$; *E. maritimum*, $2n=16$; *Lysimachia nummularia*, $2n=36$; *L. nemorum*, $2n=18$; *Sherardia arvensis*, $2n=22$; *Asperula cynanchica*, $2n=44$; *Galium saxatile*, $2n=41$; *Linnaea borealis*, $2n=32$; *Dipsacus sylvestris*, $2n=18$; *Gentiana nivalis*, $2n=14$; *Solanum nigrum*, $2n=72$; *Veronica alpina*, $2n=18$; *V. beccabunga*, $2n=$ 18 & 36; *Phyteuma orbiculare*, $2n=22$; *P. spicatum*, $2n=22$; *Galinsoga parviflora*, $2n=16$; *G. ciliata*, $2n=32$; *Chrysanthemum leucanthemum*, $2n=18$, 36 & 54; *Cichorium intybus*, $2n=18$, and *Scorzonera hispanica*, $2n=14$.—[D.H.K.]

Van Ooststroom, S. J. & Reichgelt, T. J., 1964, Nieuwe vondsten van zeldzame planten in Nederland hoofdzakelijk in 1963, *Gorteria*, **2**, 25-33. Gives details of the most interesting records made in the Netherlands in 1963.—[D.H.K.]

Van Ooststroom, S. J. & Reichgelt, T. J., 1964, Aanwinsten voor de Nederlandse adventief-flora, 6, *Gorteria*, **2**, 33-35. Adventives new to the Dutch flora in 1963 are *Kochia scoparia* subsp. *densiflora* (Turcz.) Aell., *Tetragonolobus maritimus* (L.) Roth, *Polygonum compactum* Hook. f. and *Dicentra eximia* (Ker) Torr.—[D.H.K.]

REPORT OF THE COUNCIL FOR 1964

The report and audited accounts cover the period from 1st January to 31st December 1964. Comparative figures for 1963 are given in brackets unless otherwise indicated.

During the year 134 (198) new members joined the Society, and we lost 85 (71) by reason of death, resignation and the operation of Rule 29. The total membership at the end of the year was 1595 (1546) with a net gain of 49 (127). We record, with great regret, the death of the Rev. Canon C. E. Raven, a former President of the Society.

The accounts for the year 1964 are set out on the pages immediately following this report. It is satisfactory that we have again been able to end the year with a surplus, but, as in 1963, this is because we have not incurred the full cost of printing and distributing two parts each of our journals. Had this expenditure been incurred, our outlay would have been about £500 greater and the Income and Expenditure Account would have shown only a very small surplus. Almost all other outgoings show an increase, partly owing to the increased activities of the Society and partly owing to steadily rising costs. A new item appears in the accounts in respect of the expenses of the Regional Organisation. Council has agreed that limited outlay by Regional Officers and Committees, in respect of stationery, postages and petties, shall be reimbursed by the Society and so the total cost of this expenditure during 1964 has been segregated and shown as a separate item.

On the other side of the Income and Expenditure Account, subscriptions have increased by £55 (a reflection of the increased membership) but proceeds from the sale of journals show a decrease of £49. This decrease arises mainly from smaller sales of old B.E.C. Reports, but is also due to the incidence of the dates of publication of the journals; allowing for these factors, sales of *Watsonia* and *Proceedings* to libraries, institutions and non-members have been satisfactory and continue to increase.

The transactions on the Publications Fund call for little comment. No further Conference Reports were published during 1964, but proceeds from the sale of past Conference Reports were almost as great as in 1963. A further £141 was received in respect of royalties on the *Atlas*. No transfer from the General Fund to the Publications Fund has been made during the year.

The final account of the Maps Scheme is also appended. It will be seen that this major venture ended with a small surplus of £163 which has been paid back to the Nature Conservancy in reduction of the very large grants which they had made towards the cost of the scheme.

The outstanding event of the year for botanists was the tenth International Botanical Congress held in Edinburgh during the summer. Although the Society was not able to arrange the proposed reception for foreign visitors, an exhibit illustrating our aims and activities was on view, thanks to the joint efforts of Mr. J. F. M. Cannon and Dr. F. H. Perring. Closely associated with the exhibit was the demonstration by Dr. Perring of mechanical manipulation of scientific data, familiar to all members who saw the Distribution Maps Scheme in operation. Our main publications were also exhibited and on sale through the agency of James Thin.

Last year it was reported that our regional organisation had reached completion, but this year one further step was taken whereby the North Region was divided into two, the North-east and North-west, giving us eight instead of seven Regions. The Scottish, Irish and Welsh Regions, each with an active committee, have continued to flourish. In September the South-west Region held a successful meeting at Exeter, organised by Dr. R. B. Ivimey-Cook.

The **Meetings Committee** arranged a most important event in September, when a Local Officers Conference took place at the University Botanic Gardens, Cambridge, by kind permission of the Director, Mr. J. S. L. Gilmour. Thirty-five officers attended, papers were read and discussed and many useful suggestions made, which will be embodied in a report to be published in *Proceedings*. On the day following the Conference, there was a demonstration of field experiments. Thanks are due to Dr. Perring for his excellent local organisation. The Committee was also responsible for staging the Annual Exhibition Meeting in the Department of Botany, British Museum (Natural History), by kind permission of the Keeper of Botany, Mr. J. E. Dandy. 32 (40) exhibits were on view to members and visitors, many of whom attended the President's Reception held later in the Board-room of the Museum.

Field meetings, arranged by the Field Secretary (Mr. P. C. Hall), were held in Paris and at Chichester, Sussex; Brecon; Sherborne, Dorset; Wakehurst Place, Sussex, for the study of grasses; Danbury Common, Essex, for the study of brambles; Carmarthen; West Norfolk; and in Hertfordshire for hunting aliens. Especial thanks are due to M. J. M. Rouet and members of the Société des Sciences Naturelles de Seine et Oise and the Société Botanique de France for the great success of the Paris meeting. A field meeting on Dartmoor was held on the day following the regional meeting at Exeter. The total attendance at field meetings was 187 (155). In addition the Committee has been active in arranging, with the welcome assistance of Prof. J. G. Hawkes, a Conference on *Reproductive Biology and Taxonomy of Vascular Plants* to be held at Birmingham University in April 1965.

It was recommended by the above Committee, jointly with the **Junior Activities Committee,** that the general field meetings programme be combined with the junior field meetings programme, the junior application form to be of a different colour and a booking fee of 6d per meeting per person to be charged for junior meetings. This was approved as an experimental project for one year and has been put into operation for 1965. Junior meetings were somewhat better attended than last year in spite of one meeting in Yorkshire being cancelled through lack of support. In addition to a visit to the Department of Botany and new Botanical Gallery at the British Museum (Natural History), a very successful residential excursion was held, with the assistance of Irish botanists, in Co. Galway. One-day meetings were also held at Sherborne, Dorset; Croydon, Surrey; Micheldever, Hants.; Lytham St. Annes, Lancs.; Severn Valley, Worcs.; and Runnymede, Surrey. Total attendance at Junior Meetings was 175 (192).

Under the auspices of the **Development and Rules Committee,** revised editions of the *Panel of Referees and Specialists* and *Local Organisation: District Secretaries and Recorders* were issued as well as a reprint of the *Rules,* embodying recent amendments. *The Directory of British Taxonomists and Ecologists* has been brought to an advanced state but requires final editing before being published by I.A.P.T. Many other matters affecting the Society's organisation and development were discussed by the Committee and are in hand for future recommendation. The Botanical Society of Edinburgh agreed the terms of reference of the Committee for the Study of the Scottish Flora; these had been the subject of negotiation for some time. We are indebted to Mr. D. E. Allen for accepting the Acting Secretaryship of the D. & R. Committee during the absence abroad of the Secretary, Mr. A. C. Jermy.

The urgent problem of housing and despatching the Society's publications was solved by a sub-committee set up by the **Publications Committee.** As a result of the sub-committee's negotiations, the main stock was transferred in August from the Department of Botany, British Museum (Natural History), to the offices of Messrs. T. Buncle & Co. at Arbroath. A revised list of Publications was prepared by Mr. D. H. Kent, to whom orders are now sent; Buncle's have undertaken the despatch of all orders sent on to them. Reprints for sale have been discontinued, existing stocks having been offered back to authors. The Society's thanks have been expressed to the Trustees of the British Museum (Natural History) and to the Keeper of Botany for allowing the storage of our material at the Museum for some ten years, and to Mr. E. B. Bangerter for handling sales during that time. On the Committee's recommendation, the prices of our Journals have been increased, that of *Watsonia* to 25/- and of *Proceedings* to 15/-. Two parts of *Proceedings* were published but, regrettably, only one of *Watsonia.* Progress has been made on the handbook on *Carex,* which should be well advanced by the middle of 1965.

Once again the **Conservation Committee** has been active in investigating threats to the British flora and in participating in the preparation of reports to bodies concerned with conservation problems. Suggestions, stressing the need for greater protection of wild life, were submitted to the Nature Conservancy in connection with the Countryside in 1970

Conference. The Wild Plant Protection Working Party, the constitution of which is given in last year's Council's Report, prepared an interim report, with particular emphasis on protective by-laws, which will be discussed at future meetings. A report was also prepared for submission to the Advisory Committee to the Minister of Agriculture on Pesticides. Liaison with the Nature Conservancy continued; such matters as a schedule of wet lands, the unsatisfactory status of S.S.S.I.s, *Bupleurum falcatum* in Essex and the *Spartina* marsh at Hythe (now a Nature Reserve) were under consideration. Among many other topics considered by the Committee were: a survey of the distribution of rare plants, a schedule of protected plants for our members and a new threat to Upper Teesdale and the Society will, if necessary, oppose the construction of a reservoir at the Cow Green site.

Control of the Distribution Maps Scheme, the final stages of which were the active concern of the **Maps Committee** last year, passed on 31st March from the Society's hands into those of the Nature Conservancy. A report on the final stages is presented elsewhere by Dr. Perring. Following a resolution of the Council, letters of thanks have been sent by the President to the Nature Conservancy, the Nuffield Foundation and the Professor of Botany at Cambridge University for their part in making the Scheme possible. The Committee has also been concerned with the distribution of rare plants and its recommendation that a periodic revision of the list of such plants and a systematic report on their status should be prepared every ten years has been agreed.

The Special Committee set up last year to explore long-term expansion of the Society's activities has been designated as the **Future Development Committee.** Within its wide terms of reference it has considered many aspects of expansion, including closer liaison with Societies catering for groups of non-vascular plants; broadening our educational scope; developing our regional structure. Its most important activity, however, has been consideration of a potential new journal to have a more "popular" appeal and a wider circulation than the Society's present two journals.

The *Guide for Local Flora writers,* recommended last year by the **Local Floras Committee** has been successfully published in *Proceedings* under the editorship of Dr. Perring and has already made some impact with regard to counties lacking a *Flora* or in need of an up-to-date one. The Committee has urged the need for publication of a set of maps showing vice-county boundaries. Among other matters that this Special Committee has under consideration are: methods of maintaining an index of plant records and ways of encouraging public herbaria to maintain proper indices.

The **Exhibitions Committee** was disbanded early in the year as it had not met during 1963. Its Secretary, Mr. J. F. M. Cannon, was thanked for his efficient organisation of our exhibit at the International Congress and for his final report on our permanent exhibit, the future of which is to be considered by the Development and Rules Committee.

The **Committee for the Study of the Scottish Flora** arranged an interesting programme, leaving the month of August free of meetings in view of the International Botanical Congress. A week's excursion was held in the Isle of Islay and visits of shorter length were made to Cullen, Banffshire; Glencoe, Argyllshire; and Perth. An Exhibition Meeting was held in November at the University of Glasgow. Full accounts of the work of this Committee, the **Welsh Regional Committee** and the **Irish Regional Committee** will appear in *Proceedings.* The Welsh Regional Committee is to be congratulated on the continued success of the *Welsh Region Bulletin* and the Irish Regional Committee on the discovery of a plant new to the British Isles, *Minuartia recurva,* in W. Cork.

The Council thanks the many friends of the Society who have helped it to continue its work, including our Honorary Auditors, Messrs. Price, Waterhouse & Company. We are grateful to the Nature Conservancy for allowing Council to meet in its Conference Room; to the Department of Botany, University College, London, and the Linnean Society of London for allowing our various committees to meet in their premises; to Trinity College, Dublin, the University of Glasgow and the University of Exeter for allowing our Regional Meetings to be held there. Finally, we thank the many members who have served on committees, led field meetings, organised indoor meetings, contributed to our journals and, in a variety of activities, have helped the Society to maintain its progress.

J. E. LOUSLEY, President.

25th February, 1965.

E. B. BANGERTER, Secretary.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December 1964

1963			
	Cost of Printing and Distributing:		
	Proceedings, Vol. V, Part 4, and provision for Vol. VI, Part 1 ...	£722 13 7	
	Watsonia, Vol. VI, Part 1 (balance) and provision for Part 2	808 0 2	
£1,623			£1,530 13 9
50	Grant to Maps Scheme ...		—
156	Printing Notices of Meetings		164 16 6
65	Expenses of Council and Committee Meetings ...		63 4 4
264	General printing, stationery, postages, telephone and petty expenses		252 7 8
—	Expenses of Regional Organisation		78 18 10
47	Field and Exhibition Meetings expenses less fees received		51 0 8
280	National Nature Week Exhibition expenses ...		—
235	Excess of income over expenditure credited to General Fund		615 1 10
£2,720			£2,756 3 7

1963			
£2,100	Subscriptions received ...		£2,155 6
251	Interest received		280 13
	Proceeds from Sales:		
	Proceedings ...	£70 4 0	
	Watsonia ...	249 11 9	
	Old B.E.C. Reports	0 7 10	
369			320 3
£2,720			£2,756 3 7

PUBLICATIONS FUND

Transactions in 1964

1963			
£711	Cost of printing and binding Conference Reports		—
39	Prospectuses and publicity		24 0 6
28	*Atlas of the British Flora* (first list of corrections) ...		—
	Balance to 1965:		
	General	£1,592 13 1	
	Atlas Royalties less outgoings...	1,449 12 3	
2,643			3,042 5 4
£3,421			£3,066 5 10

1963			
£2,478	Balance from 1963		£2,643 3 7
	Sales:		
249	*Conference Reports*	£243 2 11	
12	*British Herbaria* ...	3 11 10	
22	*List of British Vascular Plants* (half share) ...	15 15 2	
16	Other Publications	19 2 7	
			281 12 6
644	Royalties received on *Atlas of the British Flora*		141 9 9
£3,421			£3,066 5 10

BALANCE SHEET as at 31st December 1964

63			
	General Fund :		
	Balance 1st January 1964 ...	£1,669 12 1	
	Add : Excess of income over expenditure for year	615 1 10	
,669			£2,284 13 11
,643	Publications Fund		3,042 5 4
40	Benevolent Fund		39 11 0
,967	Creditors for Printing and General Expenses		1,378 11 2
124	Subscriptions Received in Advance		135 16 5
,443			£6,880 17 10

1963			
	Investments :		
	4½% Defence Bonds	£1,000 0 0	
	5% Defence Bonds	4,000 0 0	
£5,000			£5,000 0 0
	Cash at Bank :		
	Deposit Account	1,500 0 0	
	Current Account	380 17 10	
1,443			1,880 17 10
£6,443			£6,880 17 10

J. C. GARDINER,
Hon. Treasurer.

Audited and found correct.
26th February, 1965.

PRICE WATERHOUSE & CO.,
Hon. Auditors.

DISTRIBUTION MAPS SCHEME

ELEVENTH ANNUAL REPORT TO 31st MARCH 1964

As preparations to receive us at Monks Wood Experimental Station were not complete the Maps Scheme did not, as had been anticipated, move from 1 Brookside, Cambridge, in January; the move was finally made on 6th April a few days after the Scheme had officially come to an end.

During the period covered by this report, and subsequently, work has continued to prepare the Critical Supplement. It is now expected that this will be published early in 1966. Thanks to the generous help received from P. D. Sell and Dr. C. West it has been possible to prepare maps of all the species of *Hieracium* which occur in the British Isles; I am also very grateful to Miss Mary McCallum Webster for her help in assembling the data for mapping. Mr. E. S. Edees has worked extremely hard and has produced data so that 16 maps of *Rubus* species can be included. Many other members of the Society have helped by sending further records and material, in particular I would mention J. A. Crabbe at the British Museum who has devoted many hours to *Polypodium.*

It is a sad thought for me that this is the last annual report I shall write on the Distribution Maps Scheme, even though, Phoenix-like it lives on as the Biological Records Centre. I would like to take this opportunity of thanking all those who helped with the field work, particularly those who came with me to some of the remotest parts of the British Isles, and remained cheerful even in dull areas, often in dreadful weather. I am also immensely grateful to all the members of the Maps Committee for the time and energy they devoted to the Scheme; we were very fortunate indeed that the majority were able to serve throughout the period. Above all, I would offer my thanks to the Chairman, Mr. J. E. Lousley, and the Secretary, Prof. A. R. Clapham, F.R.S., for their almost 100% attendance, and smooth running of the committee; to John Dony for his constant help, advice, and encouragement, the best all-rounder in the team; to J. C. Gardiner for his remarkable skill as a treasurer in controlling the purse strings so well that a small surplus was handed back to the Nature Conservancy at the end; and finally, to Dr. Max Walters for having aroused my interest in the Scheme in the first place, for being Director of the Scheme with such unerring ability over the first five critical years, and for having been, and continuing to be, my friend and my colleague.

F. H. PERRING, Director.

DISTRIBUTION ATLAS ACCOUNT

for the period from 1st January to 31st March 1964

Balance from 1963 :			Maintenance of Equipment ...	£9 14 6
Current Account ...	£415 12 6		Postages and Telephones	15 9 7
Deposit Account ...	500 0 0		Printing and Stationery	12 16 10
		£915 12 6	Salaries, Wages and Clerical Assistance	685 9 3
Interest Received		4 8 9	Travelling Expenses	32 3 2
Sales of Record Cards and Maps, etc.		12 16 4	Insurance	4 19 3
			Repairs	5 4 0
			Other Expenses	3 14 0
			Balance transferred to Nature Conservancy	163 7 0
		£932 17 7		£932 17 7

J. C. GARDINER,
Hon. Treasurer.

Audited and found correct.
26th February 1965.

PRICE WATERHOUSE & CO.,
Hon. Auditors.

OBITUARIES

Guy Oldfield Allen (1883-1963).—The death of Guy Oldfield Allen on 11th April, 1963, in his 80th year, closed for me what had been a warm and enduring friendship.

Allen returned to this country in 1933 after 25 years in the Indian Civil Service, where at first he served as a magistrate in the United Provinces, and later as a judge. Ill-health prevented him accepting the permanent seat on the High Court in Allahabad. After living for a short time in Kent, he came to Enton Green, near Godalming, where he lived in a charming house overlooking wide stretches of open country.

I first got to know him in 1936, during the time he made weekly visits to the Natural History Museum in Kensington. His main botanical interest was in the Charophytes, and at that time he was working on the vast amount of Indian material he had personally collected.

On the death of James Groves in 1933, Allen acquired the deceased's material and eventually built up a herbarium of considerable size and importance. Allen worked slowly, but with immense care, and a number of papers in the scientific literature bear witness to a keen and critical appreciation of the structure of the difficult group of plants he elected to study. He was greatly concerned with the delineation of species and spent much time attempting to make permanent microscope preparations of Charophytes showing the diagnostic characters. It was no doubt due to his legal mind that he regarded with distaste the abandon with which some new species and varieties are created. For him, the evidence for so doing had to be clear and irrefutable. On the rare occasions that he permitted himself to describe a new taxon, the gestatory period was long and delivery painful.

Guy Allen's biological interests were wide, and although the Charophytes were his special subject, all aspects of natural history enthralled him. He was particularly happy when leading a small party of friends on a pond-hunting expedition, and on returning to his study, delighted to show them living pond life, crustaceans, algae, etc., under the microscope.

The proximity to his home of the Educational Museum at Haslemere provided an outlet for his botanical interest and administrative abilities, and he served on the Committee for several years. He greatly assisted his friend and colleague Sam Edwards to provide courses and lectures at the Museum which aroused a great local interest during the War and in the years immediately following.

Guy Allen typified a way of life that has all but disappeared. He was of medium height, slight of stature, with an extremely gentle manner and a soft-speaking but precise voice. He was reserved, yet generous, and was always highly appreciative of the smallest thing done for him by others. He thought little of his own work, but praised the efforts of less able men. Frivolous acquaintanceship did not interest him. His friendships were deep and sincere and they became enlivened with a boyish enthusiasm if the topic of conversation turned to Charophytes. His manner called forth from others an abiding loyalty; this is shown in the fact that many years after he had left India, his servant made many collections of Charophytes for him. His domestic life was the happiest, and he thoroughly enjoyed a countryman's life set in the loveliest part of Surrey with his wife and two daughters; it was marred only by the loss of his son who was killed in the War.

To the fast-diminishing group of those interested in Charophytes, Allen will be missed as an authority who was ever ready to provide expert knowledge and advice—to those of us who knew him well, there will always be a sense of loss that refuses to be healed.—N. I. Hendey.

We are greatly indebted to Mr. Hendey for the above appreciation of G. O. Allen, who was for many years the Society's referee for *Charophyta*. That this office was no sinecure may be judged by the constant appearance of his determinations or confirmations in "Plant Records" published in our journals. Mrs. Allen has generously presented her late husband's Charophyte herbarium to the Department of Botany, British Museum (Natural History); in addition to the collections of James Groves and his brother Henry, it contains specimens collected by the late Canon Bullock-Webster, also an authority on the group.

It comprises over 6,000 slides, about 4,000 specimens in spirit and approximately 2,000 herbarium sheets, not only of British material, but from all parts of the world. Further, a large number of his books were presented along with MS. notes for inclusion in the Department's library. A bibliography of Mr. Allen's contribution to the literature of the *Charophyta* appears below.

PAPERS, Etc., by G. O. ALLEN

1925

Notes on Charophytes from Gonda, U.P., *J. Bombay N.H.S.*, **30**, 589-599.

1927

(With J. Groves.) On some Indian Charophyta, *J. Bot.*, **65**, 335-339.

1928

Charophyte notes from Saharanpur, U.P., *J. Indian Bot. Soc.*, **7**, 49-69.

1933

Charophyte notes from Agra, U.P., *J. Indian Bot. Soc.*, **12**, 17-19.

1934

(With W. G. Herter.) Charales Uruguayenses, *Rev. Sudamer. Bot.*, **1**, 87-91.

1935

Our British Stoneworts. A group of unique and interesting aquatic plants, *Countryside*, N.S., **10**, 256-257.

(With J. Groves.) A review of the Queensland Charophyta, *Proc. Roy. Soc. Queensland*, **46**, 34-59 [errata 2 pp.].

1936

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1937

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1938

Notes on British Charophytes, *J. Bot.*, **76**, 48-50.
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1940

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1942

On the distribution of some Indian Charophytes, **150**th *Anniv. Vol. Roy. Bot. Gard. Calcutta*, 183-188.
Thomas Bates Blow (obituary notice), *Proc. Linn. Soc.*, **153**, 289-290.

1944

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1950

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1951

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1953

Typification of Nitella pseudoflabellata A. Braun, *Ann. Mag. Nat. Hist.*, Ser. 12, **4**, 606-608.

1954

An annotated key to the Nitelleae of North America, *Bull. Torrey Bot. Club*, **81**, 35-60.

1956

How to begin the study of Stoneworts, *Countryside*, N.S., **17**, 415-420.

I am grateful to my colleague, Miss P. A. Sims, for her assistance in compiling the above bibliography.—SHIRLEY P. PHILLIPS.

WENDELL HOLMES CAMP (1905-1963) of the University of Connecticut, U.S.A., who died on 4th February, 1963, was an Honorary Member of this Society and will be remembered by members mainly because of his presence with us at our Conference in 1959 when we celebrated the centenary of the publication of the *Origin of Species*. Professor Camp's paper was perhaps the most outstanding feature of this Conference. The subject was one near to his heart as he was most anxious to bridge the gap between the orthodox and more modern approach to plant taxonomy. Even more, he was worried concerning the ease with which professional botanists can create new species compared with the difficulty found by other botanists in recognising these species in the field. Camp was given to an extravagance in his speech and in the expression of his views that led many of his critics to assert that he was not serious and little better than a showman. It was, however, the device of a good teacher, used to lead the members of his audience to pursue independent lines of thought.—J. G. DONY.

PERSONALIA AND NOTICES TO MEMBERS

SIBBALDIA PROCUMBENS L.

P. D. Coker, Aylesford House School, Sandridgebury, St. Albans, Herts. is working on *Sibbaldia procumbens* and would be grateful for herbarium material, fresh specimens and ripe seeds with precise localities of collection.

GALEOPSIS

B. Gregson-Allcott, B.Sc., Hatfield College of Technology, Hatfield, Herts., is studying the genus *Galeopsis* (*G. tetrahit*, *G. bifida* and *G. speciosa*) and would be very grateful for fresh specimens, herbarium material and precise locations.

SENECIO

Ivor W. Brassington, 25 Blackmoor Road, Wellington, Somerset, is studying the various species of *Senecio* on which the Cinnabar Moth (*Callimorpha jacobae*) feeds. He would be grateful for details of species, locations, and approximate number of larvae noted.

BIDENS FRONDOSA L.

D. H. Kent, 75 Adelaide Road, West Ealing, London, W.13, is studying the spread of *Bidens frondosa* in Britain and would be grateful for herbarium specimens, fresh material and records.

FLORA OF BUCKINGHAMSHIRE

P. R. Knipe, "Charnwood", Marsham Way, Gerrards Cross, Bucks., is preparing a new Flora of Buckinghamshire and would welcome records and assistance from interested members.

A NEW FLORA OF CAERNARVONSHIRE AND ANGLESEY

Work is to start this spring on a scheme of plant recording for a proposed new Flora of these two counties.

Recording is to be carried out using a grid-square system based on the Ordnance Survey, the basic unit being a 2 × 2 Km. square or 'Tetrad'.

A pamphlet has been prepared giving more details about the recording scheme; and this can be obtained by anyone interested in helping, either by carrying out recording work, or by supplying recent plant lists, from Ian R. Bonner, Department of Botany, University College of North Wales, Memorial Buildings, Bangor, Caernarvonshire.

FIELD CLUB FLORA OF THE LOTHIANS

Copies of I. H. Martin's *Field Club Flora of the Lothians* (1934) are available to members from W. Hall, "Elmore", Broxburn, West Lothian. The price is 11/3, post free.

FLORA OF CONNEMARA AND THE BURREN

The Irish Regional Committee are organising a survey of the flora of Connemara (Co. Galway) and the Burren region (Co. Clare). It is hoped to publish a Flora after four years' field work. The data will be collected mainly by recording the occurrence of all vascular plants within a radius of 200 m. of previously determined points together with a note on abundance and type of community. Specially printed cards are available for recording. Any further ecological observations will be welcomed since it is hoped that the Flora will have a strong ecological bias. Chapters on bryophytes, lichens and marine algae will also be included.

Those interested in co-operating in the field work should get in touch with Rev. J. J. Moore, S.J., Botany Dept., University College, Dublin, 4. A small grant will be available from the Praeger Fund to help towards the expenses of those not otherwise able to participate.

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr. F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr Perring (address as above) include:

1. 35 mm. filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional record cards. Price 15s. 0d. per hundred.
3. Individual record cards. Price 10s. 0d. per thousand.
4. Vice-county maps (quarto size): Collins' "New Naturalist" at 1s. 0d. each, and *Atlas of the British Flora* base maps at 3d. each.
5. Base maps of the British Isles with 100 km. grid (quarto) at 2d. each.
6. Corrections to the *Atlas of the British Flora*: free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed, would you please send us a copy?

FLORA OF LIGURIA, ITALY

Signora Louise Moglia, Scalinata Mantaldo F21, Genova, Italy, will be pleased to show holidaying British botanists localities of interesting plants in Liguria, and is also willing to send seed of Italian plants for experimental purposes.

COLOUR TRANSPARENCIES OF EUROPEAN FLORA

O. Polunin, Dormers, Farncombe Hill, Godalming, Surrey, would be glad to know of any close-up plant portraits of widespread European (including British) species of flowering plants. He is preparing a book on the flowers of Europe, which is to be illustrated by coloured photographs.

Transparencies, preferably 35 mm. Kodachrome ($2\frac{1}{4}'' \times 2\frac{1}{4}''$ can also be used) are required for loan. After careful scrutiny, they will be promptly returned to the owner; any selected for inclusion will be required for loan at a later date and all transparencies so used will be acknowledged in the book.

Photographs must be sufficiently close to show as many botanical details as possible. They must be in sharp focus and preferably taken in situ in the field.

BRITISH LICHEN SOCIETY

The British Lichen Society has organised a Distribution Maps Scheme to record the distribution of Lichens within the British Isles. The scheme is similar to that of the B.S.B.I. being based on the 10 km. square system of the National Grid. A record card listing 154 easily identified Lichens, with one side blank for additions, is available for use in the field. Twelve members are mapping individual genera or species for early publication. Further details may be obtained from the Society's mapping recorder, M. R. D. Seaward, Lynwode, Vicarage Avenue, Wrawby, Brigg, Lincolnshire.

WILD PLANT PROTECTION BY-LAW: WILD PLANT PROTECTION WORKING PARTY

Breach of By-law—What to do.

WHAT TO DO when you see someone breaking the bye-law depends to a great extent upon the circumstances. If you are near a telephone, call the Police at once and inform the Secretary of your County Naturalists' Trust.

If, however, you are alone and are nowhere near a telephone and cannot call for immediate assistance from the Police, show the offender a copy of your County bye-law and ask him to stop uprooting the plant. Ask the offender his name and address (but he does not have to give it to you). If he does not give you his name and address and he has a car, make a note of his car number. Memorise or make a written note of the person's description, paying particular attention to any outstanding features about his appearance and clothes. If possible follow the person until you meet a policeman or follow the person to his home. Your notes must be accurate and should be made on the spot or as soon as possible thereafter.

It is better to let the offender see you. If the offender has not seen you, watch and record. Make certain that you have really seen the offence being committed and that you are not just imagining that you have seen an offence being committed. If you have a friend with you, you can often send for the Police while you stay and watch what is happening.

Whatever you do, do not be in a hurry. Remember that a detailed story with as many witnesses as possible is very important. The process is very much the same as if a botanist has seen a rare or a strange plant. One wants a detailed and complete description of the person, with particular notes on outstanding features, which should be followed by as complete a description as possible of his behaviour.

Armed with the detailed description of appearance and behaviour, go to the Police and ask them to investigate. Indicate the nature of the offence. After you have informed the Police, we should be very grateful if you would inform your County Naturalists' Trust.

If you are in any doubt or difficulty, write to your County Naturalists' Trust, who will assist you in any way they can.

The telephone number of the Council for Nature is: Knightsbridge 7412. They will assist you as they can but, apart from the Police, you should consult your local Naturalists' Trust and also report the matter to your local authority who may be the prosecuting authority in your case.

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, articles, photographs and other materials relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF "WATSONIA" and "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1 and Vol. 5, Part 5, and *Proceedings,* Vol. 2, Part 4 and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

B.S.B.I. BOOK SERVICE

Many county Floras and other botanical books are out of print and difficult to obtain and the officers of the Society receive many enquiries from members as to where they may be obtained.

A card index of members' desiderata has now been prepared with the object of assisting them to obtain books they need to carry out their studies.

The index has been prepared by the Hon. Assistant Secretary, D. H. Kent, 75 Adelaide Road, London, W.13, and members desiring to make use of this facility are invited to write to him giving details of the books which they are anxious to acquire. A stamped addressed post-card, for reply, should be sent for each book required. It must be pointed out that some botanical works are very scarce indeed and it may be some time before they can be tracked down; every effort will, however, be made to trace copies of books required.

Members who have botanical books for disposal are also invited to write to Mr. Kent giving details of the volumes concerned and their prices.

THREATS TO BRITISH FLORA

Members are urged to report to D. Streeter, 193 London Road, East Grinstead, Sussex, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Acting Secretary of the B.S.B.I. Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex), who will send a form listing the detailed information required by the Nature Conservancy. These forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Acting Secretary of the Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seed or any other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

LIST OF MEMBERS AND SUBSCRIBERS

(up to and including 31st December 1964)

Members are asked to advise the Hon. Membership Secretary, Mrs. J. G. Dony, 9 Stanton Road, Luton, Beds., of any corrections to this list.

When the year of attaining membership appears in italics the records show that the member has resigned and rejoined during the period.

Institutions are normally listed geographically, but it should be noted that many institutions who do not appear in the list purchase the Society's publications through the Trade.

F = Family Member
J = Junior Member
L = Ordinary Member who has had paid Life Composition
S = Subscriber Member

HONORARY MEMBERS

1928 Aellen, Dr. Paul, Mittlere Strasse 139, Basle, Switzerland.
1955 Andreas, Dr. Ch. H., Botanisch Laboratorium, Grote Rozestraat 31, Groningen, Netherlands.
1952 Böcher, Prof. T. W., Fortunvej 90, Charlottenlund, Denmark.
1923 Campbell, Miss M. S., F.L.S., Casa Rossa, Menton-Garavan, A.-M., France.
1931 Chapple, J. F. G., F.L.S., The Brackens, Nicholas Way, Northwood, Middlesex.
1945 Clapham, Prof. A. R., M.A., Ph.D., F.L.S, Dept. of Botany, The University, Sheffield, 10.
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1935 Drabble, Mrs. E., 17 Lewarne Crescent, Porth, Newquay, Cornwall.
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1955 Hylander, Dr. N., Botaniska Museet, Uppsala 1, Sweden.
1955 Jovet, Dr. P., Laboratoire de Phanérogamie, Muséum National d'Histoire Naturelle, 57 Rue Cuvier, Paris, 5, France.
1955 Lawalrée, Dr. A., 3 Avenue van Elderen, Bruxelles, Belgium.
1955 Lid, J., Botanisk Museum, Oslo, 45, Norway.
1927 Lousley, J. E., 7 Penistone Road, London, S.W.16.
1964 Nordhagen, Prof. Rolf, Universitetets Botaniske Museum, Oslo, Norway.
1928 Price, W. R., B.A., F.L.S., 64 Elsworthy Road, London, N.W.3.
1938 Rechinger, Dr. K. H., Burgring 7, Wien 1, Austria.
1939 Swann, Eric L., 282 Wootton Road, King's Lynn, Norfolk.
1946 Tutin, Prof. T. G., M.A., The University, Leicester.
1937 Vermeulen, Dr. P., Wodanstraat 14, Amsterdam-Zuid, Netherlands.
1955 Vilmorin, R. de, Establissements Vilmorin-Andrieux, Herbier Vilmorin, Verrières-le-Buisson, Seine et Oise, France.

1915 Wade, A. E., M.Sc., F.L.S., 71 Marlborough Road, Roath, Cardiff.
1946 Warburg, E. F., M.A., Ph.D., F.L.S., South Hayes, Yarnell's Hill, Oxford.
1928 Welch, Mrs. B., B.Sc., "Penyllan", Gadshill Road, Charlton Kings, Cheltenham, Glos.

ORDINARY, LIFE, JUNIOR, FAMILY AND SUBSCRIBER MEMBERS

1964 S Aarhus, Botanisk Institut, Aarhus Universitet, Aarhus. C., Denmark.
1954 S Aberystwyth, University College of Wales, Aberystwyth Library, Aberystwyth, Cards.
1956 S Aberystwyth, University College of Wales, Welsh Plant Breeding Station, Plas Gogerddan, near Aberystwyth, Cards.
1914 L Adair, G. S., M.A., F.R.S., Low Temperature Station, Downing Street, Cambridge.
1962 Adams, C. J., 148 Stockingstone Road, Luton, Beds.
1920 Adams, Rev. Canon J. H., M.A., St. Goran Vicarage, St. Austell, Cornwall.
1964 Adams, J., 81 Lalleford Road, Luton, Beds.
1959 Adams, K. J., "Springett", Queensborough Lane, Rayne, near Braintree, Essex.
1956 Adams, Laurence G., 36 Britain Street, Dunstable, Beds.
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1963 Addy, R. D., 84 Barnet Gate Lane, Arkley, Herts.
1961 S Adelaide, The Keeper, State Herbarium, Botanic Garden, Adelaide, South Australia.
1956 Agnew, A. D. Q., Botany Dept., Queen's College, Dundee.
1957 Alder, L. P., 64 Rugby Road, Brighton 6, Sussex.
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1963 Alexander, Mrs. Alexandra S., High Point, Merry Leazes, Hexham, Northumberland.
1962 Aliband, Thomas G., 8 Clarence Road, Kingswood, Bristol, 5.
1949 Allen, D. E., M.A., F.R.A.I., 11 Lancaster Close, St. Petersburgh Place, London, W.2.
1963 Allen, D. J., White House, Stockland, Honiton, Devon.
1958 Allport, Noel L., F.R.I.C., 325 Kennington Road, London, S.E.11.
1962 Allsop, Leo R., 5 Rothesay Way, Summer Hayes Village, Short Heath, Willenhall, Staffs.
1957 Almond, Mrs. E. L., Laverock House, St. Breward, Bodmin, Cornwall.
1954 Alvin, K. L., Ph.D., 20 Highfield Road, Hornchurch, Essex.
1951 Ambrose, F., Glendora, Cookham Rise, Maidenhead, Berks.
1953 Amshoff, Dr. G. J. H., Utrechtseweg 194, Oesterbeek, Netherlands.
1962 S Amsterdam, Bibliotheek van de Vrije Universitat, Rapenburgerstraat 120, Amsterdam, Netherlands.
1955 S Amsterdam, Koninklijke Nederlandse Akademie van Wetenschappen, Kloveniersburgwal 29, Amsterdam, Netherlands.

1951 S Amsterdam Universiteits-Bibliotheek, Singel 421, Amsterdam, Netherlands.
1955 Anderson, Derek J., B.Sc., 124 Mayplace Road East, Bexley Heath, Barnehurst, Kent.
1963 J Anderson, Mark, "Oldfield", Oldfield Road, Horley, Surrey.
1957 Anderson, Miss M. C., Botany School, Downing Street, Cambridge.
1958 Andrews, Miss C., 15A Elm Grove, Taunton, Somerset.
1948 Andrews, C. E. A., B.Sc., A.R.I.B.A., F.L.S., 114 Oxford Road, Moseley, Birmingham, 13.
1956 Andrews, Miss Sylvia Boyd, M.A., B.Sc., Wimbledon High School, (G.P.D.S.T.), Mansel Road, London, S.W.19.
1956 Angel, Dr. T. H., 47 Shrewsbury Lane, London, S.E.18.
1964 Ansell, Mrs. V. K., B.Sc., Bishops High School, Scarborough, Tobago, West Indies.
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1963 J Baggott, Glenn K., 3 Hornby Close, Walton, Liverpool 9.
1959 Bailey, William G. H., 71 Pimlico Road, London, S.W.1.
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1952 Baker, Dr. H. G., Director, University of California, Botanical Garden, Berkeley 4, California, U.S.A.
1964 J Baker, Miss J. Margaret, 9 Woodcroft Lane, Bebington, Cheshire.
1959 Bakker, Prof. D., Margrietlaan 4, Haren (Gr.), Netherlands.
1963 Baldry, E. J., 8 Beach Road, Tynemouth, Northumberland.
1947 Balfour, Mrs. E. J., B.Sc., Wester Balbirnie, Markinch, Fife.
1955 Ball, P. W., B.Sc., The Hartley Botanical Laboratories, The University, Liverpool, 3.
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1957 Barker, Ralph W., Rose Cottage, Pencaitland, East Lothian.
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1952 Bendix, M., The Manor House, Little Bealings, Woodbridge, Suffolk.
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1962 Bennett, W. F., 28 Rollo Road, Hextable, Swanley, Kent.
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1964 Benson, Miss Maureen, B.Sc., Dept. of Botany, University College of Wales, Aberystwyth, Cards.
1954 Benson-Evans, Miss K., Ph.D., F.L.S., Somerset Lodge, Merthyr-Mawr Road, Bridgend, Glamorgan.
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1961 Benton, Michael J., B.Sc., The Perse School, Hills Road, Cambridge.
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1957 Bing, Miss M. B., Ballacross, Andreas, Isle of Man.
1964 J Birks, H. J. B., Sidney Sussex College, Cambridge.
1954 S Birmingham City Museum and Art Gallery (Keeper, Dept. of Natural History), Birmingham, 3.
1919 S Birmingham Natural History Society, 1-18 Paradise Street, Birmingham, 1.
1919 S Birmingham Public Libraries (The City Librarian), Birmingham, 1.
1950 S Birmingham, University of, The Librarian, Edgbaston, Birmingham, 15.
1963 J Bisby, F. A., 1 Tregolls Avenue Road, Farnborough, Hants.
1929 Blackburn, Dr. K. B., 51 Holly Avenue, Jesmond, Newcastle-upon-Tyne, 2.
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1962 Bloodworth, D. W., B.Sc., 18 Pandora Court, Surbiton, Surrey.
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1953 Bond, Dr. T. E. T., The Research Station, Long Ashton, near Bristol.
1950 Boniface, Ronald A., 5 Grosvenor Road, London, W.4.
1961 Bonner, I. R., 84 Norfolk Avenue, Sanderstead, Surrey.
1956 Boon, H. W., 8 Barford Close, Four Forks, Spaxton, Bridgwater, Somerset.
1962 Boorman, Laurence A., 60 Southern Bypass, Oxford.
1953 Booth, Miss E. M., Lucy's Wood, Newtonbarry, Co. Wexford, Irish Republic.
1950 Borrill, M., Ph.D., Welsh Plant Breeding Station, Plas Gogerddan, near Aberystwyth, Cards.
1963 Bosanquet, Mrs. Prudence, Llwyn Celyn, Llanwrdr, Carms.

1963 Bourne, A. J., 27 Rustat Road, Cambridge.
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1964 S Bournemouth Natural Science Society, 39 Christchurch Road, Bournemouth, Hants.
1960 Bowden, Miss Jean K., The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.
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1957 Bowman, R. P., 22 Kennedy Road, Maybush, Southampton, Hants.
1950 Boyd, R. A., Dept of Botany, University of New England Armidale, New South Wales, Australia.
1963 Boyle, Miss Patricia J., M.Sc., Botany Dept., University College Science Buildings, Upper Merrion Street, Dublin 2, Irish Republic.
1949 Bradshaw, Dr. A. D., Department of Agricultural Botany, Memorial Buildings, Bangor, Caerns.
1952 Bradshaw, Miss E., 176 Appley Lane, Appley Bridge, Wigan, Lancs.
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1926 Braid, Prof. K. W., O.B.E., M.A., B.Sc., Lochview, Skene, Aberdeen.
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1933 Brenan, J. P. M., M.A., c/o The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.
1952 Brett, D. W., Dept of Botany, The University, Glasgow, W.2.
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1914 S Brighton Public Library, Church Street, Brighton, 1, Sussex.
1960 S Brisbane, The Department of Agriculture and Stock, Brisbane, Queensland, Australia.

1951 S Bristol Central Library (City Librarian), College Green, Bristol.
1959 S Bristol, Hon. Librarian, Bristol Naturalists' Society, The City Museum, Queen's Road, Bristol, 8.
1956 S Bristol, University of, Library, The University, Bristol, 8.
1960 Bristow, Alec, The Grange, Thwaite, near Eye, Suffolk.
1959 Bristow, B. R., 28 The Avenue, Mortimer Common, Reading, Berks.
1950 S British Naturalists' Association (B.E.N.A.), Hon. Assistant Sec., Miss V. M. Leather, M.B.E., Didlington, Thetford, Norfolk.
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1928 Brunker, J. P., 28 Grosvenor Place, Rathgar, Dublin, Irish Republic.
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1948 Burtt, B. L., B.Sc., Royal Botanic Garden, Edinburgh, 4.
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1957 S California, Dudley Herbarium, Stanford University, Stanford, California, U.S.A.

1950 S California, Pomona College Library, Claremont, California, U.S.A.
1955 S California, University of, The Serials Dept., General Library, Berkeley 4, California, U.S.A.
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1953 Campbell, Dr. Bruce, Hordley, Woodstock, Oxon.
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1917 S Cardiff, National Museum of Wales, Dept. of Botany (Keeper, S. G. Harrison, B.Sc., F.L.S,). Cardiff.
1956 S Cardiff, The Librarian, University College of South Wales and Monmouthshire, Cathays Park, Cardiff.
1947 Carey, Miss R., Athol House, 138 College Road, London, S.E.19.
1946 S Carlisle Public Library, Museum and Art Gallery, Carlisle, Cumberland.
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1945 Conder, P. J., Old Close Orchard, Swannes Lane, Comberton, Cambs.
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1948 Conolly, Miss Ann P., Dept. of Botany, The University, Leicester.
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1947 Cranbrook, Dowager Countess of, Snape Priory, Saxmundham, Suffolk.
1915 Creed, Dr. R. S., M.A., Church Farm House, Dry Sandford, Abingdon, Berks.
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1941 S Durham Colleges, Science Library, South Road, Durham.
1957 S Durham, Duke University Library, Durham, N. Carolina, U.S.A.
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1950 Lawrence, Prof. G. H. M., Director, The Rachel McMasters Miller Hunt Botanical Library, Carnegie Institute of Technology, Pittsburgh, 13, Pennsylvania, U.S.A.
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1963 Lee, R. M., B.Sc., A.Inst.P., St. Bede's College, Manchester, 16.
1944 S Leeds Central Library, The City Librarian, Leeds, 1.
1957 S Leek and District Field Club (A. Armitt, Representative), Post Office, Ladderedge, Leek, Staffs.
1964 J Lees, Miss Hilary H., 53 Hill Mead, Horsham, Sussex.
1924 S Leicester Museum and Art Gallery, Leicester.
1960 S Leicester, The Librarian, The University, Leicester.
1960 Lester, Richard N., Kington Court Farm, Flyford Flavel, Worcs.
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1960 S Lisbon, Museu, Laboratóro, e Jardin Botânico Faculdade de Ciências, Rue da Escola Politéenica, Lisbon, Portugal.
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1952 S Liverpool Botanical Society (Hon. Secretary, Miss V. Gordon), 23 Alder Grove, Waterloo, Liverpool, 22.
1952 S Liverpool, The Library, The University, Liverpool, 3.
1958 Livesey, Mrs. Irene, Headmaster's Bungalow, Horsley's Green School, near High Wycombe, Bucks.
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1951 S London, Birkbeck College Library (University of London), Malet Street, London, W.C.1.
1956 S London, Blackheath High School (Miss M. Abraham, Headmistress), Wemyss Road, London, S.E.3.

1954 S London, British Council (Miss E. A. Browne), 65 Davies Street, London, W.1.
1914 S London, British Museum (Natural History), Cromwell Road, London, S.W.7.
1958 S London, Borough Librarian, Metropolitan Borough of Chelsea, Public Library, Manresa Road, London, S.W.3.
1956 S London, Convent of the Sacred Heart High School, Hammersmith Road, London, W.6.
1960 S London, Dept. of Botany (Mrs. O. Skelly), Imperial College of Science and Technology, Prince Consort Road, London, S.W.7.
1956 S London, Kingsbury County Grammar School, Princes Avenue, London, N.W.9.
1932 S London, Linnean Society of, Burlington House, Piccadilly, London, W.1.
1930 S London Natural History Society, Botanical Section (Hon. Secretary, P. C. Holland), 28 Hetherington Road, London, S.W.4.
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1956 S London, The Librarian, Queen Mary College, Mile End Road, London, E.1.
1923 S London, Royal Horticultural Society, Vincent Square, London, S.W.1.
1951 S London, Science Museum, Exhibition Road, London, S.W.7.
1922 S London, South London Botanical Institute, 323 Norwood Road, London, S.E.24.
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1956 Luker, A. J., The Grammar School, Steyning, Sussex.
1955 S Lund, University Library, Lund, Sweden.
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1962 Marks, I., Conduit House, Oxford.
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1948 Morton, Prof. J. K., Ph.D., Dept. of Botany, Fourah Bay College, University College of Sierra Leone, Freetown, Sierra Leone.
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1962 Moxey, Mrs. P. A., 6 Broadlands, North Hill, Highgate, London, N.6.
1963 Mudie, Mrs. P. J., c/o Scripps Institute of Oceanography, La Jolla, California, U.S.A.
1952 Muirhead, Miss C. W., Royal Botanic Garden, Edinburgh, 4.

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1964 Murdoch, Mrs. Campbell, Simon's Close, Burford, Oxford.
1955 Murgatroyd, F., Hollins, Longley Triangle, Halifax, Yorks.
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1956 Murray, Dion, 6 Airedale Avenue, London, W.4.
1963 Musson, T. R., 62 Babbacombe Road, Torquay, Devon.

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1938 Nelson, George A., M.Sc., Ph.D., M.P.S., F.L.S., 37 The Crescent, Adel, Leeds, 16.
1963 Nesbitt, Louis, 11 Bellevue Terrace, Richhill, Co. Armagh, N. Ireland.
1957 Nethercott, P. J. M., 6 Hazelwood, Hazelwood Road, Bristol, 9.
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1950 Newbould, Mrs. P. J., Botany Dept., University College, Gower Street, London, W.C.1.
1950 S Newcastle upon Tyne, King's College (The Library), Newcastle upon Tyne, 1.
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1962 Newton, Mrs. Agnes M., Tal y Llyn, Deganwy Road, Deganwy. Caernarvonshire.
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1964 Newton, John H., B.Sc., Ivy House, High Street, Warboys, Hunts.
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1962 Newton, Philip, 57 Bloomsbury Lane, Timperley, Altrincham, Cheshire.
1928 S New York, Albert R. Mann Library, Acquisitions Division, Ithaca, New York, U.S.A.
1935 S New York Botanical Gardens (Dr. William C. Steere, Director), Bronx Park, New York, U.S.A.
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1964 S Norwich Castle Museum, The Director, Castle Museum, Norwich, Norfolk.
1919 S Nottingham, Natural History Museum, Wollaton Hall, Nottingham.
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1926 S Oslo, Universitetets Botaniske Museum, Trondhjemsvegen 23, Oslo 45, Norway.
1952 Oswald, P. H., The Rectory, Angmering, Sussex.
1950 S Ottawa, National Museum of Canada, Victoria Memorial Museum Building, Ottawa, Canada.
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1959 F Skeel, Mrs. Imelda N., Robertsholme, Chambers Green Road, Pluckley, near Ashford, Kent.
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1963 Skinner, Ashley J., Broadfield, 62 Bullocks Lane, Hertford, Herts.
1951 Skinner, T. G., 2 Woodman Avenue, Hecklegirth, Annan, Dumfriesshire.
1952 Slack, A. A., B.Sc., 195 Wilton Street, Glasgow, N.W.
1945 Sladen, W. J. L., M.B.E., M.D., D.Phil., John Hopkins University, School of Hygiene, Baltimore 5, Md., U.S.A.
1951 Slater, F., 3 Whitewall Wood, Walmersley, Ramsbottom, Bury, Lancs.
1962 J Slater, Frederick M., 48 Wood Street, Wednesbury, Staffs.
1924 Sledge, W. A., B.Sc., Ph.D., 9 St. Chad's Drive, Headingly, Leeds 6, Yorks.
1961 Sleep, Miss Anne, B.Sc., Dept. of Botany, The University, Leeds 2, Yorks.
1959 Sloman, Guy R., 4 Maple Avenue, Newton Mearns, Glasgow.
1962 S Slough, Middle Thames Natural History Society (G. Nelson, Representative), 44 Marlborough Road, Slough, Bucks.
1959 Smail, H. C. P., 6 Lansdowne Close, Worthing, Sussex.
1956 Smith, A. J. E., M.A., D.Phil., F.L.S., Dept. of Botany, University College of North Wales, Memorial Buildings, Bangor, Caerns.
1961 Smith, A. R., "Whincroft", Mary Tavy, near Tavistock, Devon.
1956 Smith, E. R., Wheat Close, Cutterbach Lane, Kington, Herefordshire.
1955 Smith, Mrs. F. G., B.Sc., Dept of Insecticides and Fungicides, Rothamsted Experimental Station, Harpenden, Herts.
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1963 Smith, James Ben, B.Sc., 7 Avington Grove, Penge, London, S.E.20.
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1921 Smith, R. L., 24 Grand Avenue, Ely, Cardiff.
1961 Smith, Miss Ursula K., 12 Millcroft, Westdene, Brighton, Sussex.
1962 Soal, S. G., M.A., D.Sc., Cae Garw, Betws-y-Coed, Caerns.
1951 S Somerset Archaeological and Natural History Society, Botanical Section (A. D. Hallam, Representative), Taunton Castle, Taunton, Somerset.
1957 Sommerville, Mrs. Alice H., M.A., B.Sc., The Herbarium, Dept. of Botany, University of Aberdeen, St. Machar Drive, Old Aberdeen.

1956 Soper, R., B.Sc., "Sunset", Leechpool Lane, Horsham, Sussex.
1952 Souster, J. E. S., 193 Kew Road, Richmond, Surrey.
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1953 Sowerby, Brian, B.Sc., 24 Windsor Grove, Morecambe, Lancs.
1927 Sowter, F. A., F.L.S., "Greenholme", Stoughton Lane, Stoughton, Leics.
1956 Spalding, Miss Ione, 19 Stream Farm Close, Lower Bourne, Farnham, Surrey.
1952 Spence, Prof. D. H. N., Dept. of Botany, Makerere University College, P.O. Box 262, Kampala, Uganda.
1960 Spooner, Dr. A. G., c/o Mr. D. Stewart, 51 Milne Street, Vale Park, Adelaide, South Australia.
1959 Sprague, Mrs. M. L., B.A., F.L.S., 7 Hatherley Road, Cheltenham, Glos.
1964 J Spray, Martin, 77 Walkley Crescent Road, Sheffield, 6.
1950 Spreadbury, W. H., 3 Sherwood Road, Seaford, Sussex.
1958 Stace, C. A., Flat 2, 81 Gatley Road, Gatley, Cheadle, Cheshire.
1957 Stafford, Dr. Patricia C., 5 Windlesham Gardens, Shoreham-on-Sea, Sussex.
1949 Stalker, Miss N. M., 12 Alexandra Road, Penrith, Cumberland.
1963 S Stanbridge Earls, The Headmaster, Stanbridge School, Stanbridge Earls, Romsey, Hants.
1954 Stearn, Dr. W. T., 17 High Park Road, Kew Gardens, Richmond, Surrey.
1958 Steel, Geoffrey, 13 Gleneagles Close, Chester.
1953 Stelfox, A. W., 21 Tullybrannigan Road, Newcastle, Co. Down, Northern Ireland.
1955 Stephen, J. David, 481 Dunstable Road, Luton, Beds.
1962 Stephens, B. M., B.Sc., 35 Stonerwood Avenue, Hall Green, Birmingham, 28.
1947 Steuart, Mrs. G M., Down, Whimple, Exeter, Devon.
1960 Stevens, A. J., Ph.D., 25 Wings Road, Upper Hale, Farnham, Surrey.
1927 Stevenson, Miss E. H., 28 Foxcombe Road, Weston, Bath, Somerset.
1963 J Stewart, G. R., 70 Manor Way, North Harrow, Middlesex.
1954 Stirling, Allan McG., 17 Austen Road, Glasgow, W.3.
1955 S Stockholm, The Director, Bergianska Trädgarden, Stockholm 50, Sweden.
1956 S Stockholm, The Librarian, Kungle Vetenskapsakadamiens Bibliotek, Stockholm 50, Sweden.
1956 Stollery, Ernest W. R., 12 Sandend, Portsoy, Banffshire.
1955 Strachan, P. W., 71 The Mall, London, N.14.
1955 Streeter, David, 193 London Road, East Grinstead, Sussex.
1963 Stunden, Mrs. M. J., The Vicarage, Pirton, Hitchin, Herts.
1955 Sturdy, Miss B. M., 3 Pendrea Place, Gulval, Penzance, Cornwall.

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1963 S Sunderland, Public Libraries. Museum and Art Gallery (Director, J. T. Shaw, A.L.A.), Borough Road, Sunderland.
1956 Swain, Mrs. C., 11 St. James Road, Harpenden, Herts.
1957 Swain, Miss C. A., 253 Crescent Drive, Petts Wood, Kent.
1932 Swaine, Miss A. K., Pisang Cottage, Nailsea, Bristol.
1958 Swan, G. A., D.Sc., Ph.D., F.R.I.C., Dept. of Chemistry, King's College, Newcastle upon Tyne.
1950 S Swansea, University College of, Singleton Park, Swansea, Glam.
1963 J Swindells, R. J., 12 Hawthorn Road, Wallington, Surrey.
1953 Swinscow, T. D. V., M.B., B.S., F.L.S., London Road, Knebworth, Herts.
1953 Swinton, Mrs. A. E., Swinton House, Duns, Berwickshire.
1955 Sworder, R. Ian, Little Dudswell, Northchurch, Berkhamsted, Herts.
1951 Sylvester-Bradley, P. C., Noon's Close, Stoughton, Leicester.

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1951 Tallantire, Miss A. C., B.Sc., P.O. Box 262, Kampala, Uganda.
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1962 Tarn, J. R., Dept. of Botany, The University, Edgbaston, Birmingham, 15.
1954 Taylor, F. J., M.Sc., Ph.D., Dept. of Botany, Fourah Bay College, Freetown, Sierra Leone.
1956 Taylor, Lady, Mount Ebford, Topsham, Devon.
1933 L Taylor, Sir George, D.Sc., 49 The Green, Kew, Richmond, Surrey.
1958 Taylor, Miss Monica, 62 Scotts Lane, Shortlands, Kent.
1946 Taylor, Peter, c/o The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.
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1960 Teesdale, Lt. Ian D., R.N., c/o Lloyd's Bank Ltd., Fore Street, Taunton, Somerset.
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1962 J Thomas, Henry, 11 St. Mary Street, Monmouth.
1960 Thomas, J. Miles, 39 Colcot Road, Barry, Glam.
1963 Thomas, Miss M. E., 10 Summer Hill Avenue, Steeton, Keighley, Yorks.

1963 Thomas, Richard Eastaway, Flat 10, Gorstage Hall, Cuddington, Northwich, Cheshire.
1958 Thompson, Jack, 3 Shirley Gardens, Sunderland, Co. Durham.
1962 Thompson, M. A., Fairview Wood Road, Longsdon, Stoke-on-Trent, Staffs.
1963 Thompson, M. G. V., B.Sc., Bradfield College, Berkshire.
1957 Thomson, Mrs. S. E., c/o The Training College, Hereford.
1962 Thomson, Miss C. Morellen, B.Sc., 14 Regent Terrace, Edinburgh, 7.
1962 Thorold, C. A., Woburn Experimental Station, Husborne Crawley, Bletchley, Bucks.
1959 Timson, John, B.Sc., Ph.D., 24 Woodstock Road South, St. Albans, Herts.
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1957 S Tonbridge School (H. G. Edwards, Senior Biology Master), Tonbridge, Kent.
1962 S Torquay Natural History Society, The Museum, Torquay, Devon.
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1946 Townsend, C. C., 392 Staines Road, Twickenham, Middlesex.
1964 Treharne, John G., Gwalia, 26 Heol Morfa Brenin, Carmarthen.
1964 Trewinnard, R., c/o Parks Dept., 79 Ferensway, Kingston-upon-Hull, Yorks.
1963 J Tribe, Ian S., 6 Privett Road, Purbrook, Portsmouth, Hants.
1956 Trist, P. J. O., O.B.E., B.A., M.R.A.C., 14 Northgate Street, Bury St. Edmunds, Suffolk.
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1960 J Tutin, Miss Caroline E. G., Home Farm, Knighton, Leicester.
1960 F Tutin, Dr. W., Home Farm, Knighton, Leicester.
1963 S Twickenham County School. (Miss M. G. Monger), Twickenham County School, Clifden Road, Twickenham, Middlesex.
1963 S Twickenham, Maria Grey Training College (E. A. Catherau, Lecturer in Biology), Biology Dept., 300 St. Margaret's Road, Twickenham, Middlesex.

1946 Twist, A. F., The White House, Great Chesterford, Saffron Walden, Essex.
1958 Tyrer, Dr. F. H., Bent House, Newhey, Rochdale, Lancs.

1950 S Uppsala, Kungl. Lantbrukshögskolan Biblioteket, Uppsala 7, Sweden.
1955 S Uppsala, Universitets Biblioteket, Uppsala, Sweden.
1954 S Uppsala, Växtbiologiska Institutionen, Villavägen 14, Uppsala 8, Sweden.
1951 S Utrecht Botanical Museum and Herbarium, State University of Utrecht, Lange Nieuwstraat 106, Utrecht, Netherlands.

1937 Valentine, Prof. D. H., M.A., Ph.D., F.L.S., Dept. of Botany, the University ~~Science Laboratories, South Road, Durham~~. MANCHEST 13.
1961 Vane, F. R., King's Norton Grammar School for Boys, Northfield Road, Birmingham, 30.
1956 Vaughan, A. H., Northwood, Alpass Road, Liverpool, 17.
1952 Vaughan, Mrs. H. R. H., M.B.E., Nantymwyn, Rhandirmwyn, Llandovery, Carms.
1964 Véal, Mrs. H. A. G., 124 Barrowgate Road, London, W.4.
1956 Venning, Brigadier F. E. W., C.B., C.B.E., D.S.O., Pinewood, Butts Ash, Hythe, Southampton.
1954 Ventura, Richard J., 6 Macaulay Buildings, Widcombe Hill, Bath, Somerset.
1953 Vesian, Miss D. E. de, B.Sc., F.L.S., 55 Queens Road, Cheltenham, Glos.
1927 S Victoria, The Public Library of, Swanston Street, Melbourne, Victoria, Australia.
1955 S Vienna, Der Generalsekretar, Zoologisch-Botanisch Gesellschaft in Wien, Vienna 1, Burgring 7, Austria.
1956 S Vincente Lopez, Miguel Raggio, Editor, "Phyton", Gaspar Campos 841, Vincente Lopez (Bs. As.), F.N.G.B.M., Argentina.
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1937 Waldy, Hon. Mrs. H. P., Chadlington, Oxford.
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1951 Walker, R. K., Cooper's Green, Windlesham, Surrey.
1954 Walker, Dr. S., Sub-Department of Genetics, The University, Liverpool, 3.
1963 Walker, Dr. T. G., Botany Dept., Kings College, Newcastle-upon-Tyne, 1.
1932 Wallace, E. C., 2 Strathearn Road, Sutton, Surrey.
1952 Wallace, T. J., B.Sc., Goodmans, Membury, Axminster, Devon.

1956 S Wallington, County Grammar School for Boys (W. T. Hutchins, Headmaster), Croydon Road, Wallington, Surrey.
1960 Walpole, Michael, 45 Farndale Drive, Loughborough, Leics.
1957 Walsh, Michael L., 53 Parnell Road, Harold's Cross, Dublin, 12, Irish Republic.
1944 Walters, Dr. S. M., Botany School, Downing Street, Cambridge.
1962 J Wall, M. J., Old Court Cottage, Titsey Road, Limpsfield, Oxted, Surrey.
1949 Wanstall, P. J., Dytchleys, Coxtie Green, Brentwood, Essex.
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1958 Ward, Mrs. Joan, The Lodge, Copyhold, Cuckfield, Sussex.
1959 Ward, J. A., Caretaker's Cottage, Gillott's High School, Henley-on-Thames, Oxon.
1933 L Warren, W. E., Selborne, Horsell Rise, Horsell, Woking, Surrey.
1959 S Warwick Natural History Society (Hon. Secretary), The County Museum, Warwick.
1950 S Washington, Smithsonian Institution (The Librarian), Washington 25, D.C., U.S.A.
1950 S Washington State University Library, Serial Record Section, Pullman, Washington 25, D.C., U.S.A.
1956 S Washington, University of, Library, Acquisitions Division, Seattle 5, Washington, D.C., U.S.A.
1956 Wastie, R. L., Lavender Cottage, Quatermile Road, Godalming, Surrey.
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1948 Watson, H. G., Parkdean, Strathview Road, Kirriemuir, Angus.
1964 Watson, L., Dept. of Botany, The University, Southampton.
1952 Watt, A. S., Ph.D., Botany School, Downing Street, Cambridge
1957 Watt, Dr. George, Rosevale, Langholm, Dumfriesshire.
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1964 J Watts, C. H., Gonvena House, Wadebridge, Cornwall.
1954 Watts, W. A., School of Botany, Trinity College, Dublin, 2, Irish Republic.
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1963 Webb, Mrs. H. K., 31B Lansdowne Avenue, Newbold, Chesterfield, Derbys.
1961 Webb, Mrs. P. E., Latimer's, Weston-sub-Edge, Chipping Campden, Glos.
1936 Webster, Miss M. McCallum, F.L.S., Rose Cottage, Dyke, by Forres, Moray.
1960 Webster, W. S., 7 Station Road, Steeton, near Keighley, Yorks.

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1962 Wells, T. C. E., The Nature Conservancy, Monk's Wood Experimental Station, Abbots Ripton, Hunts.
1963 S Welwyn Natural History Society, c/o Dr. B. Jennings, 3 Warren Way, Digswell, Welwyn, Herts.
1963 Wenham, Martin, Dept. of Botany, University of Aberdeen, St. Machar Drive, Old Aberdeen.
1914 West, C., O.B.E., D.Sc., M.A., F.L.S., 96 New Road, Ditton, near Maidstone, Kent.
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1964 Weston, Mrs. I., 4 Riseholme Lane, Riseholme, Lincoln.
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1962 White, John L., 72 St. Andrews Road, Southsea, Hants.
1955 White, P. H. F., M.A., F.L.S., Science Schools, Harrow School, Harrow-on-the-Hill, Middlesex.
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1952 Whitehead, Mrs. L. E., Rydal Mount, 37 Bodenham Road, Hereford.
1943 Whiting, Miss M. M., 60 Forest Road, Kew, Richmond, Surrey.
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1952 Whitton, B. A., 91 The Quadrant, London, S.W.20.
1955 Wicking, Charles E., 140 Railton Road, London, S.E.24.
1957 Wiggins, E. D., c/o Fisons Ltd., Harvest House, Felixstowe, Suffolk.
1960 S Wijster, Biologisch Station (Dr. J. J. Barkman), Kampsweg 29, Wijster (Dr.), Netherlands.
1962 Wilberforce, Capt. P. W., L.D.S., F.L.S., R.A.D.C., 14 Reid Avenue, Caterham, Surrey.

1960 Wilkinson, Miss Hazel P., Gresham House, 13 Bramham Gardens, London, S.W.5.
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1954 Willé, J. E., M.A., B.Sc., 77 Gurney Court Road, St. Albans, Herts.
1956 F Willé, Mrs. P. A., 77 Gurney Court Road, St. Albans, Herts.
1964 J Williams, J. D., 17 Muirfield, East Acton, London, W.3.
1963 J Williams, John, Bryn Awel, Holway Road, Holywell, Flintshire.
1946 Williams, John, M.A., 41 Raeburn Avenue, Dartford, Kent.
1953 Williams, J. Trevor, M.A., Ph.D., 18 Dawson Road, Long Lane, Cheadle, Cheshire.
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1960 Willis, A. J., B.Sc., Ph.D., Dept. of Botany, The University, Bristol, 8.
1957 Willis, Miss Janet C. N., M.A., 1 Holly Road, Ipswich, Suffolk.
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1957 Wilmot-Dear, P. W., 45 Whitney Drive, Stevenage, Herts.
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1963 Wilson, Miss Joan F., c/o Dept. of Biology, The University, Lancaster.
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1953 Wilson, Mrs. O. B., 60 Storey's Way, Cambridge.
1964 Wilson, Rudolph A., Welwyn, Kernan, Lurgan Road, Portadown, Co. Armagh, N. Ireland.
1964 S Wimborne, Canford School, Biology Dept., Wimborne, Dorset.
1962 S Winchester College Natural History Society, The College, Winchester, Hants.
1954 Wise, Dr. David, 170 Nether Street, London, N.3.
1952 Wise, R. D., Bacons, Henham, Bishop's Stortford, Herts.
1963 J Wiseman, Miss Janet, 14 York Road, Birkdale, Southport, Lancs.
1956 Wolfe, Victor, LL.B., 26 Redesdale Road, Mount Merrion, Dublin, Irish Republic.
1951 S Wolverhampton, South Staffordshire Naturalists' Society (Secretary, Miss K. B. Walker), 97 Allen Road, Wolverhampton, Staffs.

1946 Wood, Miss A. F., Waysmeet, Cores End, Bourne End, Bucks.
1963 Wood, Miss Gillian M., 114 St. James Road, Bridlington, Yorks.
1961 J Wood, J. R., Ironside, Little Garretts, North End, near Great Dunmow, Essex.
1963 Wood, Mrs. Rhodope M., 48 Addison Road, Kensington, London, W.14.
1954 Woodell, S. R. J., M.A., F.L.S., Ph.D., University Dept. of Botany, South Parks Road, Oxford.
1964 J Woodhams, B. E., 17 Greenside, Mote Park, Maidstone, Kent.
1938 Woodhead, J. E., B.Sc., F.R.I.C., F.P.S., 25 Lovelace Road, London, S.E.21.
1963 Woodman, Mrs. F. L., Bankfield, Allithwaite, Grange-over-Sands, Lancs.
1962 Woods, D. B., B.Sc., Botany Dept., University College of North Wales, Bangor, Caerns.
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1947 Woodward, Mrs. E. W., B.Sc., Ph.D., Dept. of Botany, The University, Bristol, 8.
1951 Woolman, J. F., F.L.S., Cardah, Olton Road, Shirley, Birmingham.
1964 Woolley, Raymond, 22 South Broadway Street, Burton-on-Trent, Staffs.
1962 Woropay, O., Ph.D., Zakutok, 8 Glenfield Avenue, Wetherby, Yorks.
1958 Wraith, Mrs. M., 73 West Way, Rickmansworth, Herts.
1953 Wray, E. V., Selwood, Humberstone, Grimsby, Lincs.
1927 L Wright, Dr. F. R. Elliston, Braunton, Barnstaple, Devon.
1963 Wright, Lady Sarah, Coles Farm, Chewton, Mendip, Bath, Somerset.
1956 Wrigley, Mrs. Fenella, New Hall, Cambridge.
1963 J Wurzell, Brian, 47 Rostrevor Avenue, London, N.15.
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1963 Wynne, M. Goronwy, B.Sc., Gwylfa, Lixwm, Holywell, Flintshire.

1951 Yeo, P. F., University Botanic Garden, Cambridge.
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1950 Young, Miss B. M., D.Sc.(Hort.), N.D.H., The Glen, Rickmansworth, Herts.
1945 Young, Donald P., B.Sc., Ph.D., A.R.I.C., Green Woods, 3 Essendon Road, Sanderstead, Surrey.
1921 L Young, Miss Gertrude A., Mansefield, Arrochar, Dunbartonshire
1959 Young, Maurice G., B.Sc., 77 Liddell Gardens, London, N.W.10.
1953 Younger, Mrs. H. J., Baro, Haddington.
1959 Yule, Mrs. I. S., 29 Montague Road, Bournemouth, Hants.

1959 S Zürich, Librarian, Institut für Spezielle Botanik der Eidg, Technischen Hochschule, Universitätstrasse 2, Zürich 6, Switzerland.

SUMMARY OF THE ABOVE MEMBERSHIP LIST

Honorary Members	24
Life Members	18
Ordinary Members	1,199
Subscriber Members	196
Junior Members	116
Family Members	41
Total	1,594

The following joined or rejoined the Society between 1st January and 31st March 1965:—

Bazzard, James S., c/o Baywood Chemicals Ltd., Sherford House, Bromyard, Herefordshire.

J Bennett, Frank, 128 Brockley Rise, London, S.E.23.

Brown, Trevor J., 38 Charles Street, Kettering, Northants.

J Cutting, Miss Ruth M., Apple Bee, Rockland St. Mary, Norwich, Norfolk, NOR 08W.

Deans, R. F., 11 Romsey Road, Winchester, Hants.

Finch. R. A., 175 Harold Road, Hastings, Sussex.

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Editor: D. H. KENT

Vol. 6 DECEMBER 1965 Pt. 2

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SOME FURTHER LIGHT ON THE HISTORY OF THE VASCULUM

By D. E. Allen

Since the publication of the history of the vasculum (Allen, 1959) a considerable amount of additional evidence has inevitably come to light. Much of this merely furnishes corroborative detail to parts of the story that were previously thin; but in certain respects (and in one respect in particular) the new material compels a major alteration in focus.

The first point that now needs revision is the date at which 'vasculum' lost its traditional italics and slipped into use as an ordinary English word. Previously, the earliest this could be traced back, at least as a word clearly used in preference to any other, was 1830—in both cases, however, in works specially devoted to a description of botanical equipment. The discovery of a passage by Bowman (1828) now indicates that the word was already familiar among leading amateurs even before this. Praising the botanically-minded innkeeper of 'The Running Horses' near Box Hill, he adds: "May botanists continue to find at this humble inn, cleanliness and civility, a trowel to dig up their plants, and even a vasculum to secure them". But Bowman was seasoned and experienced. At this time and well into the next decade or two 'botanical box' or 'botany box' were still being regularly used in preference by various writers, possibly because 'vasculum' was felt to sound pretentiously technical and esoteric. Certainly, in an article for beginners, Kent (1828) plays safe with "a little tin case", merely mentioning in a footnote that this is "called by botanists a vasculum".

This last author goes on to add that a vasculum is "more readily obtained by the title of a sandwich-box; being precisely the same thing, and the latter name being more familiar to the tinman". Dale (1838), even more unequivocally, recommends to entomologists "a vasculum (for sandwiches)". This outright identification with sandwich-boxes is, however, misleading. The more usual, and traditional, shape of the vasculum was not the rectangular one of the sandwich-box but the more or less cylindrical outline of the (much more ancient) candle-box. The vascula turned out on a standard pattern for university students about this time certainly bore far more resemblance to the latter. Sandwich-boxes, as the tin containers in widest general use for an outdoor purpose at this period, doubtless came to be adopted automatically by those newcomers to the study least indoctrinated with the older field-botany traditions. As sandwich picnics were an essentially British innovation, the unique influence on design of sandwich-boxes in this country may well explain why British vascula from this time onwards have been mostly shorter and flatter than their counterparts on the Continent.

Hitherto it has not been clear how widely vascula were in use among British botanists before about 1830, for there are very few mentions of them earlier than this, partly because of the dearth of literature containing instructions on how to collect. Two items of evidence have now been discovered that indicate that by 1800, at any rate, their use was already indeed fairly general. In a paper delivered to the Linnean Society two years earlier Stackhouse (1800) can be found advising that "as plants cannot be preserved any length of time in perfection even with the usual apparatus of a *vasculum,* or tin-case, no botanical traveller should be without a small press". This is backed up by an account by the Edinburgh botanist, Patrick Neill (1853), of his first meeting with George Don, sometime between 1797 and 1802:—

> "On reaching Forfar towards evening, I soon found Don's garden, and entering, inquired of a very rough-looking person with a spade in his hand, whom I took for a workman, whether Mr. Don was at home. The answer was, 'Why, Sir, I am all that you will get for him'. Having apologised in the best way I could, I stated that when I left home I did not anticipate a visit to Forfar, else I could have brought a note of introduction from Mr. John Mackay. Mr. Don, pointing to my botanical box, immediately said, 'That is introduction enough to me'."

Thus, already at this date the vasculum was sufficiently standardised in design and in wide enough use to serve as a badge of recognition between botanists—a striking indication of the emergence even so early of the consciousness of forming a special in-group of their own.

It is to this early visual significance of the standardised tin that we should, perhaps, look for an explanation for the long failure to exploit the advantages of small airtight bags. "A tasteful oiled silk bag" for carrying a woman's bathing-dress was one of the fashions of 1814 (Cunnington, 1937, p.47); but apart from a mention by an American writer (Short, 1833), there appears to have been no interest till Landsborough (1849), in his best-selling book on seaweeds, prescribed "a tin vasculum or an oil-skin bag". Even then their use seems to have been very limited.

The history of the vasculum during the eighteenth century is still obscure, though there is reason to believe that it had become part of the standard equipment by 1775, if not earlier. Before this date—if we exclude a mystifying Austrian reference that apparently would have us believe that a tin collecting-case was used in the Alps in the early seventeenth century—the only mention that could previously be traced was the description by Linnaeus of the '*Vasculum Dillenianum*' in his *Philosophia Botanica* in 1751. The choice of epithet seems to imply that Linnaeus (who himself merely used "a parcel of paper stitched together for drying plants" on his Lapland journey in 1732) owed his entire knowledge of this collecting aid to J. J. Dillenius, who came over from Giessen to live in England in 1721. Dillenius' own writings throw no light on the matter. Assuming that Linnaeus saw his vasculum when the two had their only meeting in person, at Oxford in 1736, it could still not be ruled out that the implement was a German invention that Dillenius had brought with him when he immigrated.

It can now be shown that at least two botanists had tin collecting-cases in Britain as early as 1720*. In answer to a letter from John Wilmer, a London apothecary and his first botanical mentor, asking him to say if there were any of his botanical utensils he would like to have (Wilmer was evidently overwhelmed with business and field-work was temporarily out of the question), John Martyn replied on April 9th of that year: "I thank you for the kind offer of your utensils, I have got a Tin Box, made after the pattern of yours . . . .". Both letters are now in the Banks collection in the Department of Botany, British Museum (Natural History), and the key part of the second one is quoted by Martyn & Gorham (1830, p. 13). Wilmer was then aged about twenty-three and Martyn a few months under twenty-one. Martyn, in due course to be Professor of Botany at Cambridge but at this time a rather frustrated clerk in his father's counting-house in Cheapside, was just starting to form a herbarium and that summer went on at least two of the 'Herbarizings' organised by the Society of Apothecaries for its apprentices. The very next year he and Wilmer were two of the founders of the first Botanical Society (of London), which held meetings in the City and lasted till the end of 1726. As Dillenius was the president, certainly two and quite possibly three out of the known total membership of twenty-three are thus now revealed as owners of vascula. Conceivably every member had one. It is possible, even, that vascula were regulation equipment ordained by the Society of Apothecaries for those attending its 'Herborizings', just as a century later they apparently had to be carried by all who went on the first student excursions at both Edinburgh and Cambridge.

Wilmer had begun his apprenticeship in the Society of Apothecaries in 1712. Did he in turn first learn of the advantages of the tin case from attending the Society's 'Herborizings'? Evidence of a long-standing tradition of the use of the vasculum by the Apothecaries and their physic garden at Chelsea is, unfortunately, slight and not completely convincing; nevertheless, some pointers

*Since this paper went to press it has come to light that vascula were in use even earlier—in 1704, just within the lifetime of Ray. William Stukeley, the great antiquary, records in his *Commentaries* that on going up to Cambridge to study medicine he frequently went "a simpling" that summer with various fellow students, "armed with Candleboxes and Ray's *Catalogus*" (*The Family Memoirs of the Rev. William Stukeley, M.D.*, Ed. W. C. Lukis, 1880, *Surtees Soc.*, 73, p. 21). That early vascula were often, or even usually, candleboxes has previously only been surmise. This discovery now converts this into certainty.—D.E.A.

do exist. Writing of the period 1823-33, Field & Semple (1878, pp. 142, 146) record that on the Society's excursions led by the redoubtable Thomas Wheeler, an attendant carried a large metal box for the collecting of the official specimens for later demonstration, and each student wore a similar but smaller box slung round his shoulder. Wheeler was then in his seventies, but he had been Demonstrator to the Society from 1778, and over the years had built the 'Herborizings' into a veritable ritual. His predecessor in the post had been William Curtis; and it is tempting to see in the vignette depicting botanists and a vasculum on the title page of the latter's *Flora Londinensis* (the first part of which is known to date from 1775) a portrayal of an actual scene on one of the Society's excursions, or else on one of those that had to be made privately by the Demonstrator, if necessary with two or three assistants, to gather plants two days before the Society's 'General Herborizing' each July. Curtis was appointed to the post in 1773, only five years after coming to London as an apprentice. Shortly before his appointment, early in 1770, the Committee of the Chelsea Garden, as noted in their minute-book (now in the Guildhall Library), had obtained "a dozen of black tin square boxes". Their purpose is not explicitly stated, but the fact that Mr. Warden Lisle was "desired to pay for them and the clasps for the Herbarium" suggests they were intended for collecting. It is conceivable that it is one of these very tins that appears in the *Flora Londinensis* vignette.

Using Dillenius' (presumed) vasculum as a stepping-stone, it is not an impossible jump from 1770 to 1720. Nevertheless, the possibility of an unbroken tradition must remain a conjecture. There is no evidence, most unfortunately, of how the Apothecaries collected their plants on Thomas Johnson's famous excursions around 1630. And between the time of Johnson and the time of Wilmer, only collecting-books are mentioned (or else, when roots were required for transplanting, baskets)—by Lhwyd in 1682 and 1686, in sending instructions from Oxford to his kinsman David Lloyd in Merioneth (Gunther, 1945, pp. 69, 81), and by Petiver in two of his broadsheets for collectors issued sometime about 1700. Just possibly they used tins themselves and only recommended the more readily-procured paper folders to their agents. The real truth, however, will now almost certainly never be known.

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H. C. WATSON AND THE ORIGIN OF EXCHANGE CLUBS

By D. E. Allen

The idea of the organised exchange of scientific specimens on a nation-wide scale, an idea which was to be so fruitful for the development of botany and (to a much lesser degree) zoology during the last hundred years, appears to have had its birth in a hitherto overlooked letter to Loudon's *Magazine of Natural History* in October, 1829. The contribution, like so many to that journal, was only signed by initials, but these ("H.C.W."), the style and the fact that it emanated from Edinburgh are sufficient to identify the author without any doubt as H. C. Watson.

In this letter he points out that the local naturalists often experience great difficulty in procuring specimens from areas other than their own (a problem doubtless very much his own at that time, when he must have been amassing material for his first substantial work, *Outlines of the Geographical Distribution of British Plants,* privately printed in 1832). To remove this hindrance to progress, he suggests that collectors should have some fixed place where their surplus specimens can be sent and from which they can receive back others that they particularly want. The scheme might possibly be run as a financial speculation, the organiser either making stipulated charges on all exchanges effected (a brokerage commission, in other words) or levying an annual subscription or entrance fee on all who contributed. The best plan, he thinks, would be for people to mark their desiderata in certain standard published works which would serve as catalogues, each item being marked with a number corresponding to its rarity or other circumstance enhancing its value.

These suggestions brought an enthusiastic reply a few months later from J. E. Bowman, a Wrexham banker and a leading field botanist of the day:

> "Faithful coloured engravings are too expensive for the majority; indifferent ones are worse than useless; and even the best are less valuable for reference than the specimens themselves. At present, very few of these last can be purchased, even in London; some of our birds perhaps may, and the entomologist, by well-directed exertion, may procure a few of our finer Lepidoptera; but the botanist of plants absolutely none".

Bowman emphasised that whoever operated the service would need to be thoroughly competent, ideally only being appointed after scrutiny by a panel of experts in different branches of natural history. He supported Watson's suggestion of marking each species with a number indicating its value. "These values", he added, "should be fixed, or at least revised, by several individuals in each department, to insure accuracy, and catalogues should then be printed".

Little, however, came of this straight away. A professional shell-collector (Warwick, 1831) offered his services as manager of such a venture, but he admitted he had no knowledge of botany or geology and no one seems to have taken any notice.

On February 9th, 1836, three years after Watson had moved to live near London, the Botanical Society of Edinburgh was founded at the instigation of a group of Professor Graham's students led by Edward Forbes (Balfour, 1858), with the exchange of specimens as one of its principal functions—"a new feature in the constitution of such a society", as the *Magazine of Natural History* pointed out. A committee was appointed to conduct this exchange according to certain fixed regulations laid down at the very outset, and a catalogue of British flowering plants and ferns was specially printed which members were urged to use when sending in lists of their desiderata, to ensure uniformity of reference.

The resemblances to Watson's original scheme were clearly close, and it seems quite likely that he had fostered the idea among the Society's founders either in his Edinburgh student days or subsequently in correspondence. It is certainly significant that in the very first year Watson made more use of the Society's exchange facilities than almost anybody else. He is also singled out for mention for contributing a catalogue marked for his own local area—indicative of his eagerness to secure as varied and extensive material as possible through this novel means, by tempting northern and western collectors with a detailed display of the range of desirable items that they could potentially expect in return. For the very fact that a contributor could state what specimens he particularly wanted—and have reason to expect them in proportion to the amount and value of what he contributed himself—was a vital aspect of Watson's original scheme (and by no means necessarily one that would have found its way into anyone else's). Watson's characteristic farsightedness can perhaps be recognised, too, behind the Society's ordinance that a record of all labels sent in with material for exchange was to be preserved, with a view to their use in the compiling of local Floras and ultimately of a complete Flora of Britain.

Within a matter of months the Edinburgh Society was duplicated (presumably copied), in all essential details, by a group of London botanists who, after several meetings (*Mag. Pop. Science*, 1836, **2**, 321) beginning on 27th July, eventually chose 29th November, the anniversary of the birth of Ray, to constitute themselves officially as the Botanical Society of London. In this society exchange activities were not given quite so much prominence, and Watson's name does not appear at first in the lists of members. When eventually he did join, however, he quickly became a foremost contributor to the Annual Distribution, and it was mainly through his efforts that the first edition of the *London Catalogue of British Plants* was brought out for this purpose, rather belatedly, in 1844.

The greatly increased exchange of specimens brought about by the two societies not only stimulated field botany as a whole, but also enormously enriched Watson's own collection and so speeded the work on British plant distribution that culminated in *Topographical Botany*. When the Botanical Society of London collapsed in 1857, it was the exchange activities—clearly the real core that had kept it going—that alone were carefully preserved, so ensuring that an unbroken tradition, if a tenuous one, extends down to the B.S.B.I. of to-day (Lousley, 1957). If, therefore, the inferences set out above are correct, Watson can be regarded as, indirectly, the main spiritual begetter of the Society —and the name of its Journal is revealed as apter even than those who chose it probably suspected.

ACKNOWLEDGMENT

I should specially like to thank J. E. Lousley for reading through a first draft of this paper and making a number of useful additional points.

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ADDITIONAL NOTES ON VERONICA FILIFORMIS

By E. B. BANGERTER and D. H. KENT

Since the publication of our earlier papers on *Veronica filiformis* (Bangerter & Kent, 1957 and 1962) additional data have been accumulated. These are now presented to bring up to date the known distribution of the species.

FLOWERING PERIOD AND GROWTH

Salisbury (1962) points out that plants frequently spread with a radial increment of over 20 cm. in a season, this confirms our earlier findings (Bangerter & Kent, 1962), he further records that each of the stolons produced will frequently bear eleven or more potentially rooting nodes.

EUROPEAN RECORDS

BELGIUM. Sternon & Goffort (1955), discuss the propagation and spread of the species in that country.

DENMARK. Østergaard (1960) comments upon the cultivation of *V. filiformis* in Denmark, while Pedersen (1963) gives an account of its history and spread as an adventive. It is mainly a pest of garden lawns and is rare in pastures. The latter account is illustrated by a map showing the distribution of the species in the country.

ESTONIA. Echwald (1960) refers to the introduction and spread of *V. filiformis* in Estonia and claims that it is becoming a serious pest of grasslands.

SWITZERLAND. Becherer (1962) gives further records for Switzerland.

AMERICAN RECORDS

UNITED STATES. Eyerdam (1955) reveals that in addition to records from the north-eastern United States and adjacent Canada, the species occurs in the Pacific North-west in open woodland near Seattle, King County. Dr. Lloyd Shinners informs us that a specimen gathered in 1949 from the latter locality is preserved in the herbarium of the Southern Methodist University, Dallas, Texas.

V. FILIFORMIS AS A BRITISH ADVENTIVE

Salisbury (1962), compares the spread of *Veronica persica* and *V. filiformis* in Britain, and expresses the view that most, if not all, of the plants of the latter species in this country originated from the same spruce. We have continued to find very little evidence of fruiting, and have received only one more record "with capsule".

The known British and Irish vice-control distribution of *V. filiformis* as an established escape should now read: 1-90, 92-105, 107-109, 111 and 112. H. 1-5, 7-13, 15, 16, 20, 21, 25-28, 30, 33-35, 37-40. S. The plant is thus now known from 109 of the 112 vice-counties in Great Britain, as well as the Channel Islands, and from 28 of the 40 Irish vice-counties.

BRITISH AND IRISH RECORDS

The following list gives records additional to those cited by Bangerter & Kent (1957 & 1962), including details from herbarium specimens examined. The abbreviations used for herbaria are those given by Kent, Bangerter & Lousley (1958). An asterisk prefixing a vice-county number indicates a new vice-county record.

CHANNEL ISLANDS

GUERNSEY: car park, Manor Hotel, Petit Bot, 1962, *Miss M. McCallum Webster* (BM, K).

SARK: Seigneurie Lane, 1936, *L. Lyle* (BM), det *E. B. Bangerter*, 1963.

V.-c. 1. W. CORNWALL: Roadside verge, Falmouth, 1964, *Mrs. J. Richards.*

3. S. DEVON: Sidcliffe, Sidmouth, c. 1950, *D. G. Satow.* Rampant garden weed, Hartley, Plymouth, 1964, *D. G. Satow* (BM). Seaton, *M. A. Fixsen*: Branscombe Churchyard (Wilkinson, 1964).

4. N. DEVON: garden weed, Clawton Vicarage, near Holsworthy, 1944, *Rev. H. Harvey* (BM). Luppitt, *I. Jefferies* (Wilkinson, 1964).

7. N. WILTS: Bremhill Churchyard, 1962, *T. G. Collett. River banks*, Manton, *D. C. C. Hughes* (Grose, 1962). Monckton Park, *J. D. Grose* (Grose, 1964).

8. S. WILTS: deserted garden, Imber (Grose, 1962). Roadside between Dinton and Fovant, *B. M. Stratton* (Grose, 1964).

9. DORSET: garden weed, Lewcombe Manor, East Chelboro', 1963; Lewcombe Churchyard, 1963, *R. S. R. Fitter.*

10. ISLE OF WIGHT: spreading in many areas, 1962 (White, 1964).

11. S. HANTS: garden weed, Furzey, Minstead, 1963, *R. S. R. Fitter.*

14. E. SUSSEX: carpeting bank by stream running into the Ouse on Avin's Farm, near Ardingley Station, 1953; still there, 1960, but apparently much diminished; near the Ouse on eastern outskirts of Rivers Wood, opposite Ardingley College, 1960; verges in Horsted Keynes village, and elsewhere in the parish, c. 1956; under trees Church Lane, Dunehill, 1960; roadside verge, Kingscote, 1960; verges at Scaynes Hill, 1961; bank of Ouse above Freshfield Bridges, 1961; weed of lawns, Newick, 1960; roadside verge, west of Hassocks Station, 1960, *R. C. Palmer.*

15. E. KENT: road verges near houses, Appledore, 1962, M. G. *Collett, D. H. Kent & B. Wurzell.* Garden weed, St. Stephen's, Canterbury, 1962, *Dr. A. G. Spooner.*

16. W. Kent: pest of lawns and garden weed, Orpington and Badgers Mount, 1961, *Dr. A. G. Spooner*. Bexley, 1965, *Mrs. L. M. P. Small* (BM).

17. Surrey: garden weed, Cheam, 1957, *Dr. A. G. Spooner*. Top of the banks of Tanner's Brook, south of Dorking, in a lush pasture, far from houses, 1962, *Miss B. M. C. Morgan*. Holmwood Common, 1962, *Miss B. M. C. Morgan & J. E. Lousley*. Nutfield (with capsules), 1960, *Miss B. A. Kneller*. Ewhurst Churchyard, abundant, 1963; in grass, Southcote, Hindhead, 1964, *D McClintock*. Becoming well naturalised in the Haslemere district (Howard, 1962). In herbaceous border, grounds at Quatermaine School, Haslemere, 1963, *A. C. Jermy* (BM). Old churchyard, Woldingham, 1962, *R. Clarke*. Pest of lawn, Carshalton, 1965, *Miss M. E. Kennedy*.

19. N. Essex: pest of lawn, Harlow, 1949, *R. Doggett*. Garden weed, Little Hallingbury, 1962, *J. L. Fielding*. Weed of lawns and grassland, North End, Great Waltham, 1962; weed of lawns, Barnston, 1962, *J. R. Ironside Wood*.

20. Herts: Brunswick Park, east of Friern Barnet, *J. G. Dony*. Garden weed, Harpenden, 1961, *R. C. Palmer*. Waste ground, Arnos Grove, 1962, *B. Wurzell*. Garden weed, Sawbridgeworth, 1962, *Mrs. L. M. P. Small*. Meadow near houses, Chorley Wood, 1963, *J. G. Dony*. *Mrs. C. M. Dony & D. H. Kent*. Garden weed, Chorley Wood, 1965, *Miss D. M. Hillcoat* (BM).

21. Middlesex: Marble Hill Park, Twickenham, 1965, *Mrs. L. M. P. Small*: Marble Hill, Twickenham, under trees near entrance to Orleans Road, 1965, *Miss M. B. Gerrans* (BM). Pinner Churchyard, 1965; Harmondsworth Churchyard, 1965, *D. H. Kent*.

22. Berks: roadside verge, Streatley, c. 1958, *R. C. Palmer*. Christchurch Meadow, Caversham, *Mrs. A. M. Simmonds, Reading Nat.*, **17**, 42. Ashampstead Churchyard, *Miss Nelmes, Reading Nat.*, **15**. 24. River meadow, Medmenham; Thames-side Promenade, Reading, forming ground flora with grass, *Mrs. A. M. Simmonds, Reading Nat.*, **16**, 25. Tangier Island, Eton, spreading as a garden weed, *C. W. Willink* (Hyde, 1962). In mown grass beside pond near Bishop's Gate, Windsor Great Park, 1965, *Miss M. B. Gerrans* (BM).

23. Oxford: grassy bank, Piddington, near Bicester, 1963, *P. G. Sheasby & J. D. Sheasby*. Bank at top of Church Lane, Iffley, 1960; Over Worton, near Deddington, 1960; weed in gardens of Chastleton House, Chastleton Village, 1961; roadside verge, Idbury, near Kingham, 1962, *R. C. Palmer*.

24. Bucks: roadside verge, Keep Hill, High Wycombe, 1952; Tylers Green, 1958; garden weed, Bassetsbury, 1956-58, *Dr. A. G. Spooner*. Hughenden and Wycombe Marsh, *Mrs. B. Marcan* (Ambrose, 1964). Small colony in grass verge of towpath bank of river Thames near railway bridge opposite Fishery Estate, Maidenhead, 1965, *G. A. Matthews* (BM).

27. E. Norfolk: garden weed, Horning, 1951, *Dr. A. G. Spooner*.

29. Cambridge: Snailswell, 'a whole field blue with it', 1963, *Miss M. McCallum Webster* (BM).

*32. Northants: pest of lawns, Oundle, Peterborough, c. 1957→, *I. Hepburn*. Lawns and grounds of Delapre Abbey, Hardingstone, abundant, 1962, *J. L. Gilbert*. Road verge Blakesley, 1962, *T. G. Collett*. Grassy banks, Oundle, 1963, *J. S. Rees*. Cottesbrooke, Kelmarsh, 1963 (Payne, 1964). Canal bank, Stoke Brueone, 1964. *Kettering & District Nat. Soc. Field Meeting*, comm. *Mrs. G. M. Gent*.

33. E. Gloucester: Overbury Churchyard, 1947, *Cotteswold Naturalists' Field Club Meeting;* Sheepscombe; Withington Woods, 1953, *R. J. M. Skarrat*; Packham Woods; Hailes Woods, *Cotteswold Naturalists' Field Club Meetings;* Stancombe Lane, Winchcombe, *Cdr. R. Dudley-Smith;* near Chipping Campden, 1962, *Miss Caddick*, all comm. *Miss D. E. de Vesian*. Garden weed, Didbrook, very abundant, 1961, *Miss D. E. de Vesian*. Quarry near Painswick Beacon, 1964, *Mrs. B. H. S. Russell*. Roadside verge, Westington, 1962, *'H.M.C.'* (de Vesian, 1964).

34. W. Gloucester: near Hawbridge, west side of river Severn, 1955, *Miss D. E. de Vesian*.

35. Monmouth: pest of lawns, Ridgeway, Newport, 1952, *Dr. A. G. Spooner*.

38. Warwick: pest of lawns, Kenilworth Castle, 1963, *T. G. Collett*.

45. Pembroke: Llanycefn; St. Ishmaels, 1964; roadside verge, Llawhaden, 1965, *T. A. W. Davis* (BM). Derelict garden, Penty Park, Clarbeston Road, 1957; Llwyngwair Nevern, long established, 1964; garden weed, Hean Castle, Saundersfoot, 1965, *T. A. W. Davis*.

48. Merioneth: Glyndyfrdwy, *Miss V. Gordon;* Corwen area, *R. E. Collins* (Benoit & Richards, 1963). Roadside banks, Penhelyg, 1962-63 (Teague, 1964).

52. Anglesey: Red Wharf Bay, 1931, *A. E. Bradley* (BM), det *E. B. Bangerter*, 1963.

53. S. Lincoln: Wigtoft Churchyard, well established, 1963, *C. J. Allerton*, comm. *Miss E. J. Gibbons*.

54. N. Lincoln: field between Louth and Stewton, 1935, *Miss Noel* (BM).

55. (Rutland): weed in lawn, Oakham Castle, 1962, *J. R. Ironside Wood*.

56. Nottingham: garden weed, Wellbeck and Langar Hall (Howitt & Howitt, 1963).

58. Chester: naturalised in a field, Rock Ferry, 1947, *J. A. Crabbe* (BM).

59. S. Lancaster: in grass, Holden Clough, near Clitheroe, 1964, *D. McClintock*.

64. Mid-W. York: roadside near Grassington, and near Feizor village, *Mrs. F. Houseman, The Nat.*, **1962**, 26. Grass verge, College Barn, Northgate Lane, Linton, 1963, *G. A. Shaw;* lawn at Bradsey (Nelson, et al, 1963). North bank of Wharfe, opposite Manor Park, Barley in Wharfedale, *F. Houseman, The Nat.*, **1965**, 27.

65. N.-W. YORK: roadside between Sedbergh and Dent, *Miss B. A. Kneller*. Near Marsett, Wensleydale; roadside near Hartforth House, Gilling West, Richmond, *Mrs. J. Holloway, The Nat.*, **1964**, 30.

67. NORTHUMBERLAND, S.: verge to road by cottage, Kilbryde, Corbridge, 1965, *Miss M. McCallum Webster* (BM).

69b. N. LANCASTER: grassy verge outside cottage, Skelworth, 1962, *J. R. Ironside Wood*. Pest of lawn, Wray Castle, 1962, *P. J. Taylor & P. M. Dennis*, comm. *J. R. Ironside Wood*.

71. ISLE OF MAN: abundant in churchyard, Lezayre, two miles south-west of Ramsey, 1960, *Miss M. B. Bing* (BM), comm. *D. E. Allen*: Jurby, 1962, *J. E. Lousley* (BM).

76. RENFREW: Lochside station, 1964, *D. McClintock*.

77. LANARK: Stonehouse, 1965, *S. W. Birnage* (BM).

82. HADDINGTON: railway siding, Saltown, 1962; edge of track to sea, Greencraig House, Craigielaw Point, 1963, *Miss M. McCallum Webster* (BM).

83. EDINBURGH: grassy bank near Juniper Green, *E. P. Beattie*.

84. LINLITHGOW: grassy bank near Bathgate, *E. P. Beattie*.

85. FIFE: track to sea, east of Hopetown House, in grass, 1965, *Miss M. McCallum Webster* (BM).

87. W. PERTH: rough ground by meadows, Callander, 1965, *Miss M. McCallum Webster* (BM).

88. MID PERTH: waste ground, Station Road, Methven, 1965, *Miss M. McCallum Webster* (BM).

89. E. PERTH: Pitlochry, 1965, *T. G. Collett*. River shingle, Killiecrankie, 1965, *Miss M. McCallum Webster* (BM).

94. BANFF: distillery yard by a stream, Dufftown, 1963; pest of lawn, Kilowen, Macduff, 1964, *Miss M. McCallum Webster* (BM).

95. ELGIN: garden weed, Milton Brodie, 1965, *Miss M. McCallum Webster* (BM).

96. EASTERNESS: east bank of river Ness, near houses, 1961, *Miss M. McCallum Webster* (BM).

*102. S. EBUDES: kitchen garden path, Ardlussa House, Jura, 1961 (McClintock, 1962).

104. N. EBUDES: verge to road, Broadford, Skye, one small patch, 1962; not apparently in nearby gardens, *Miss M. McCallum Webster* (BM).

108. W. SUTHERLAND: roadside, Melness, 1962, *C. R. Lancaster*.

112. ZETLAND: grassland near houses, North Roe, 1961, *W. Scott & J. R. Ironside Wood*. By roadside near Vidlin School, Lunnasting, *W. Scott*, comm. *R. C. Palmer*. Garden weed, Lerwick, *R. C. Palmer*.

H.1. S. KERRY: dunes at Derrynane, 1965, *Miss M. McCallum Webster* (BM).

H.4. MID CORK: weed in Dr. Scully's garden, Rushbrook, 1933 (DBN).

H.7. S. TIPPERARY: bank near railway bridge, near Ballydiehid House, Cahir, 1965, *Miss M. McCallum Webster* (BM).

*H.15. S.-E. GALWAY: grass by stream, Kilbormer, 1962, *N. D. Simpson & C. West*.

H.21. DUBLIN: in garden, covering lawn, Clontarf, 1962, *A. C. Jermy* (BM).

*H.25. ROSCOMMON: rubbish-tip at crossroads, Roscommon, 1962, *Miss M. McCallum Webster* (BM).

H.27. W. MAYO: wood between road and sea, Mulrany, 1962, *Miss M. McCallum Webster* (BM).

H.30. CAVAN: grass plot, Farrinseer, 1938, *Faris* (DBN).

ACKNOWLEDGMENTS

We are again indebted to the many friends and correspondents who have kindly provided records and specimens, and in particular to Miss M. J. P. Scannell for details of material in the herbarium of the National Museum of Ireland, Dublin, and to Miss M. M. McCallum Webster for much material from Scotland and elsewhere.

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THE EARLIEST RECORD OF SPARTINA MARITIMA IN BRITAIN

By J. C. E. Hubbard

(The Nature Conservancy, Furzebrook, Wareham, Dorset)

The earliest record of *Spartina maritima* (Curt.) Fernald was given by Stapf (1908) as "it has been known for a long time (since 1629) and beyond doubt is truly indigenous in Europe". Although Stapf did not quote an authority for this statement, it would appear to have originated from Hanbury and Marshall (1899) who gave the first record of *Spartina maritima* as '1629 *Spartum nostras parvum,* Johns. Kent, 7'. This refers to a journey by Thomas Johnson along the Kent coast in July and August 1629 during which he visited the coastal marshlands. '*Spartum nostras parvum*' was included in his general list of coastal plants but this name was subsequently used by Hudson (1762) as a synonym for *Nardus stricta* and *Ammophila arenaria.* In 1666 Merret (1666) described a '*Sparteum capite bifido vel gemino*' from Crixey Ferry in Essex. These specimens are in Merrett's collection contained in Herb. Sloane 33 and 34 and although unlabelled can readily be identified as *Spartina maritima.* Herb. Sloane also contains specimens of *Spartina maritima* collected by Buddle, Vernon, Floyd and Courten from Frambridge Ferry, Essex, in 1703. On the same page of Buddle's collection are specimens of *Spartina maritima* and *Nardus stricta* labelled respectively '*Sparteum Essexianum spica gemini clausa*' and '*Spartum nostras parvum*'.

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Stapf, O., 1908, Spartina townsendii, *Gard., Chron.*, **43**, 33-35.

FERNS ON CHURCH WALLS IN NORFOLK

By J. H. Silverwood

With an average annual rainfall of approximately 625 mm. (25 inches) and a more or less complete absence of natural rock outcrops, any large-scale distribution of ferns in Norfolk is not to be expected. There are no fewer than 650 pre-Victorian parish churches and, according to Pevsner (1962), no other county can compare with this figure. There is little in the way of indigenous building-stone apart from the ubiquitous flint with which most of the churches and their walls were made. Stone from the famous Limestone in Northamptonshire, 'Barnack stone', was imported and used in some of the richer buildings.

During 1964 I made a survey of the fern populations growing on the walls of a cross-section of some 150 churches. Rather over half had no ferns at all but the remainder had 10 different species representing 7 genera. Although as many as five species occurred on one church, the usual numbers were not more than two.

The distribution was as follows:—

Polypodium vulgare *sensu lato*	on	32	churches
Phylittis scolopendrium	,,	21	,,
Asplenium ruta-muraria	,,	13	,,
A. trichomanes	,,	12	,,
A. adiantum-nigrum	,,	16	,,
Dryopteris filix-mas	,,	25	,,
Ceterach officinarum	,,	1	church only
Pteridium aquilinum	,,	1	,, ,,
Polystichum aculeatum	,,	2	churches
P. setiferum	,,	1	church only

The occurrence of *Ceterach officinarum* is an interesting example of the persistence of a rare species which was recorded from Forncett St. Peter as long ago as 1886. The single plant found on the wall of the ruined Saxon cathedral at North Elmham disappeared following cleaning operations about 1960.

Since Norfolk is a county not particularly rich in ferns, it might be interesting to compare these figures with a similar survey made in other parts of the British Isles.

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Two recent newcomers suggest that the fern population of Norfolk is on the increase. Both are making use of unusual places in substitution for their normal rupestral habitat. They are *Thelypteris dryopteris* from the disused railway at Mundesley, 1959, K. H. Bull, and *Cystopteris fragilis* growing beneath the platform of Salhouse station, 1958, J. G. Dony, and from the sides of brick-drains along the runway of the disused airfield at Hardwick near Tasburgh, 1963, Mrs. S. Addington.—E. L. Swann.

PLANT NOTES

15/5b. **Asplenium trichomanes** L. subsp. **quadrivalens** D. E. Meyer emend. Lovis, 1964, *Brit. Fern Gaz.*, **9**, 152; *A. trichomanes* L. subsp. *quadrivalens* D. E. Meyer, 1962, *Ber. Deutsch. Bot. Ges.*, **74**, 456, *nomen ambiguum; A. lovisii* Rothm., 1963, *Excursionsfl. Deutsch.*, **4**. *Kritisch. Ergänz.*, 5; *A. trichomanes* sensu H. P. Fuchs, 1963, non L., *Acta Bot. Acad. Sci. Hung.*, **9**, 20.

The following description is provided by Lovis (1964).

Rhizome scales > 5 mm., linear-lanceolate, with dark brown central stripe. Fronds 10-18 (-25) cm. long, tapering towards apex, apex acute, 16-30 pairs of pinnae; *petiole* dark brown, *pinnae* 0·4-1·2 cm. long, oblong, usually parallel-sided, texture robust except in shaded situations, relatively crowded, insertion of upper pinnae square or somewhat oblique, terminal pinna inconspicuous, narrow; *stomata* 35-37 μ long (range of means 41-49 μ). Sori (4-) 5-8 (-10) on middle pinnae. Chromosome number $n=72$, $2n=144$. In crevices of basic rocks and walls, sometimes on neutral rocks. Throughout Europe, but less frequent in the north. Widely distributed in both northern and southern hemispheres.

Benoit (1964) has shown that *A. trichomanes* subsp. *quadrivalens* is the common plant in Merioneth (v.c. 48), usually growing on old crumbling mortared walls, characteristically with *A. ruta-muraria*, and in crevices in limestone rocks. *A. trichomanes* subsp. *trichomanes*, on the other hand, is found in somewhat basic mountain rocks, on woody banks and overgrown dry stone walls. Less a calcicole than subsp. *quadrivalens* and occurred in moderately acid habitats.

Both Lovis (1955) and Benoit (1964) report the sterile triploid hybrid *A. trichomanes* subsp. *quadrivalens* × subsp. *trichomanes* from Merioneth.

The following table showing the distinguishing morphological characters between the two subspecies is given by Lovis (1964).

ASPLENIUM TRICHOMANES

	Subsp. TRICHOMANES	Subsp. QUADRIVALENS
RHIZOME SCALES		
Length	Up to 3·5 mm.	Up to 5·0 mm.
Shape	Lanceolate	Linear-lanceolate
Central stripe	Red-brown	Dark brown
FRONDS		
Length	8-18 (-25) cm.	10-18 (-25) cm.
Pinna pairs	(10-) 14-28	16-30
Shape	Tapering	Tapering
Apex	Acute	Acute
PETIOLES		
Colour	Red-brown	Dark brown

PINNAE		
Length	0·25-0·75 cm.	0·4-1·2 cm.
Texture	Delicate	Robust
Shape	Suborbicular, auriculate when luxuriant	Oblong, parallel-sided
Separation at apex	Distant	Crowded
Insertion (upper pinna)	Oblique	Square, or ± oblique
Terminal pinna	Narrow, inconspicuous	Narrow, inconspicuous
STOMATA		
Mean length	38-43μ	41-49μ
SORI		
(Middle pinnae)	4-6 (-8)	(4-) 5-8 (-10)
SPORES		
Mean length	29-36μ	34-43μ
CHROMOSOME NUMBER		
(2*n*)	72	144
HABITAT	Non-calcareous rock	Usually basic rock
DISTRIBUTION IN EUROPE	Central and northern Europe, especially upland regions	Throughout Europe but less frequent in the north

REFERENCES

BENOIT, P. M., 1964, The two types of Asplenium trichomanes, *Nature in Wales*, **9**, 75-79.

LOVIS, J. D., 1955, The problem of Asplenium trichomanes, in LOUSLEY, J. E., *Species Studies in the British Flora*: B.S.B.I. Conference Report No. 4, 99-103. London.

———, 1964, The taxonomy of Asplenium trichomanes in Europe, *Brit. Fern Gaz.*, **9**, 147-160.

—D. H. KENT.

153/2×1. **Amaranthus hybridus × retroflexus = A. × adulterinus** Thell., 1928, in *Fedde. Repert.*, **24**, 301; *A. hybridus × retroflexus* proles *ozanonii* Thell., 1914, in Aschers. & Graebn., *Syn. Mitteleur. Fl.*, **5/1**, 263; *A. hybridus × retroflexus* proles *zobelii* Thell., 1914, *op. cit.*, 264; *A. hybridus × retroflexus* proles *turicensis* Thell., 1914, *op. cit.*, 264; *A. × turicensis* (Thell.) Domin, 1935, in *Preslia*, **13-15**, 66; *A. × zobelii* (Thell.) Probst, 1949, *Wolladventivfl. Mitteleur.*, 75; *A. × ozanonii* (Thell.) Priszter, 1949, in *Ind. Hort. Bot. Univ. Budapest*, **7**, 117. V.c. 34, W. Glos.; Avonmouth, 3 Oct. 1959, C. & N. SANDWITH 5738 (*Herb. Kew*). V.c. 37, Worcs.; Charlton, in beet-field, introduced with wool-shoddy, 8 Oct. 1961, M. MCCALLUM WEBSTER. 7075 (*Herb. Kew.*).

The possibility of hybrid amaranths occurring in Britain was indicated in my account of *Amaranthus* (1961, in *Watsonia*, **4**, 264), although at that time I had not seen any. Since then, convincing specimens of the above hybrid between two of the most frequently occurring species in this country have been examined. The identification of both was kindly confirmed by the eminent specialist on the genus, P. Aellen, during his visit to Britain in 1964.

The Avonmouth specimen was mentioned by the late N. Y. Sandwith (1965, in *Proc. Brist. Nat. Soc.*, **31/1**), though the apparently untenable name *A. × ozanonii* was used for the hybrid. The statement there that four British gatherings of the hybrid had been seen was due to a misunderstanding: only the two gatherings cited above were actually collected in Britain.

A. hybridus × *retroflexus* is particularly characterised by the perianth-segments of the ♀ flowers being oblong (often narrowly so) rather than spathulate as in *A. retroflexus*, often obtuse at apex, but varying to acute sometimes on a single plant, with the midrib often more or less excurrent. The form of the inflorescence is intermediate between *A. hybridus* and *A. retroflexus*, but with a tendency to produce terminal cylindrical "tails", though these are usually shorter than in *A. hybridus*. The general facies of the above gatherings recalls *A. retroflexus* rather than *A. hybridus*, and confusion with the former is thus more probable.

The nomenclature of this hybrid presents some problems. Thellung's original nomenclature (1914, see above) was irregular according to the present International Code. He used *A. hybridus* in a wide sense, and divided the hybrid with *retroflexus* into three "proles", to each of which he gave an epithet in that rank, though no binomial to the hybrid itself. He later (1928, see above) rectified this omission by publishing *A.* × *adulterinus* which was directly equivalent to the hybrid in the wide sense he had previously adopted. This name, though apparently the correct one for the hybrid, has been frequently overlooked by recent authors, who have usually employed one or another of Thellung's original "proles" epithets, as if he had published them as binomials, although in fact none was given binomial status until after the publication of *A.* × *adulterinus* (see references above).—J. P. M. BRENAN.

193/1. ANTHYLLIS VULNERARIA L. subsp. VULNERARIA var. COCCINEA L. V.c. 45, Pembroke; rocks near the 'Cauldron' west of St. Govan's Head, 1837, EDWIN LEES (as *Anthyllis vulneraria β Dillenii* Sch. (*Herb. Mus. Wales*); in short turf on the limestone cliff at Flinston, 1964, T. A. W. DAVIS, det. J. CULLEN (*Herb. Mus. Brit.; Herb. Liverpool Univ.*).

A very dwarf form with bright rose-red petals. It was growing in a mixed population with plants of *A. vulneraria* L. subsp. *vulneraria* var. *coccinea* L./*langei* Jalas rather more numerous than those of var. *coccinea*. The two forms are very distinct and no intermediates were found. Both are dwarf, but whereas var. *coccinea*/*langei* had stems to 14 cm., var. *coccinea* had none exceeding about 8 cm. The petals of var. *coccinea*/*langei* are cream, flushed rather dull rose-pink. Edwin Lee's locality is within 450 m.: his specimen prompted a search in the area.

There were many plants in an area about 20 m. in extent on a moderately steep rocky slope at the brow of the cliff. The sward was thin and very short: it is heavily grazed by sheep in winter. I found no other population of *Anthyllis vulneraria* nearer than 250 m. where there was a small patch of var. *langei*, the common form in south Pembrokeshire.

Dr. J. Cullen writes of my specimen that it "is most interesting—it matches the Gottland and Öland plants very well indeed, differing a little in its more dense indumentum and slightly shorter calyx. It is the first really convincing specimen of var. *coccinea* I have seen from Britain."—T. A. W. DAVIS.

436/0. **Odontites lutea** (L.) Reichb., 1832, *Fl. Germ. Exc.*, 359; *Euphrasia lutea* L., 1753, *Sp. Plant.*, 604; *Bartsia lutea* Reichb., 1862, *Icon. Fl. Germ.*, **20**, 56; *Orthantha lutea* (L.) Kern. ex Wettst., 1895, *Pflanzenfam.* **iv**, 36, 101. V.c. 22, Berks; near Aldermaston, close to the site of an old aerodrome, at least a thousand plants growing on gravelly soil, September 1965.

Plant annual, semi-parasitic on the roots of grasses and various herbs, 10-50 cm. high, with the habit of *Odontites verna*. Stems with appressed hairs pointing downwards. Leaves lanceolate, opposite, ± toothed, up to 4 cm. long by 4 mm. wide, with appressed hairs. Corolla yellow, about 8 mm. long, ciliate, exceeding the calyx. Anthers orange, exserted. Calyx appressed, hairy, with acute teeth. Native of southern Europe from Spain through southern France and Germany to Austria, Switzerland and Hungary, and extending to the northern Balkans and southern Russia.

Species associated with *O. lutea* at Aldermaston are listed below with indications of their frequency:—

Agrostis tenuis—a.
Betula pendula—o.
Centaurium erythraea—o.
Cerastium fontanum
  subsp. triviale—o.
Chrysanthemum leucanthemum—r.
Cirsium palustre—o.
Daucus carota—o.
Erigeron acer—r.
Fragaria vesca—r.
Holcus lanatus—f.
Hypericum perforatum—o.
Hypochoeris radicata—o.
Juncus tenuis—o.
J. effusus—o.
Linum catharticum—o.
Lotus corniculatus—o.
Medicago lupulina—o.
Potentilla erecta—o.
Prunella vulgaris—o.
Ranunculus repens—o.
Rubus spp.—o.
Salix cinerea subsp. oleifolia—o.
  (subsp. atrocinerea)
Senecio jacobaea—r.
Trifolium dubium—o.
T. repens—o.
Ulex europaeus—o.
Verbena officinalis—r.
Vicia tetrasperma—o.

O. lutea was probably introduced during the Second World War and established itself without being noticed previously. Other alien species, e.g., *Ononis natrix* L. and *Stachys recta* L. were recorded from another old aerodrome nearby, at Crookham Common, just after the war.—H. J. M. Bowen.

536/c. **Echinops commutatus** Juratzka, 1858, *Verh. zool.-bot. Ges. Wien*, **8**, 17; Hegi, 1928, *Ill. Fl. Mitteleuropa*, **6** (**2**), 811; Hayek, 1931, Prodr. Fl. Balc., **2** (**5**), 689, *Fedde Rep. Beih.*, **30**; *E. globifer* Janka, 1860, *Linnaea*, **30**, 581; *E. exaltatus* auctt., non Schrad., 1809, *Hort. Gotting.*, **15**; *E. sphaerocephalus* auctt., non L., 1753, *Sp. Plant.*, 814. V.c. 21, Middlesex; in waste land amongst rank vegetation, north end of Hendon Golf Links near railway, 1931, F. Ballard, det. C. C. Townsend (*Herb. Kew.*, as *E. sphaerocephalus* L.). V.c. 56, Notts.; colonising the roadside between Ollerton and Worksop, 1962, has been there for many years, R. C. L. Howitt, det. C. C. Townsend (*Herb. Kew.*).

Perennial herb with pinnate leaves, the pinnae decurrent along the leaf axis, whitish-cottony on the lower surface, rather sparsely setulose-hairy above, lower leaves to c. 40 cm. or more, pinnae deeply, irregularly and acutely lobed, sharply spinous all round the margin with the stoutest spines at the tips of the lobes. Stem strong, cottony, bearing 1-2 capitula 4-6 cm. in diameter. Involucral bracts in several rows, the outer from a long narrow base abruptly expanded to a short, deltoid, dentate-laciniate lamina, passing gradually into the obovate-lanceolate, acuminate, dentate-laciniate inner rows; all glabrous dorsally. Florets blue, with long narrow corolla-lobes, long-exserted. This species is a native of Central Europe and the Balkans, and has no doubt escaped from cultivation in other localities than the above. The following key is given to distinguish it from *E. ritro* L. and *E. sphaerocephalus* L., the most frequently recorded introduced *Echinops* species.

Leaf segments glabrous above, narrower .... *E. ritro* L.
Leaf segments glandular-hairy or setulose above, broader.
    Leaf segments densely glandular-hairy on the upper surface; outer involucral bracts glandular (glands obvious when young, often ± evanescent with age) .... *E. sphaerocephalus* L.
    Leaf segments sparingly setulose on the upper surface; outer involucral bracts always glabrous .... *E. commutatus* Jur.

—C. C. Townsend.

544/e. **Centaurea eriophora** L., 1753, *Sp. Plant.*, 916; Wilkomm. & Lange, 1870, *Prodr. Fl. Hispan.*, **2**, 146; Quezel & Santa, 1963, *Nouv. Flore Alg.*, **2**, 1022. V.c. 13, W. Sussex, garden weed, Chichester, 1965, Lady Miles, det. F. M. Jarrett. V.c. 15, E. Kent; appeared in a garden, Birchington, 1962, M. C. Rees, det. C. C. Townsend (*Herb. Kew.*).

Annual herb, 9-60 cm., dichotomously branched from the middle or a little below with long, ascending branches and shortly pedunculate or subsessile lateral capitula. Leaves lanceolate to linear-oblong, entire (in both the British gatherings) or pinnatifid, covered with an evanescent cottony down (especially on the lower surface) and whitish papillate hairs; upper leaves broadly and longly decurrent, lower leaves long-attenuate and pseudopetiolate, not decurrent. Capitula globular, c. 1·75 cm. in diameter excluding the spines of the involucre; involucral bracts yellowish-green, oblong-ovate, each terminated by a strong brownish spine about equalling it in length, the spines bearing several pairs of lateral spinelets below; between the spines is woven a ± dense, web-like cottony indumentum. Florets yellow. Native of Spain, Portugal and the Mediterranean, N.-W. Africa. Our two commonest introduced yellow-flowered *Centaurea* species, *C. solstitialis* L. and *C. melitensis* L., do not possess the characteristic cottony indumentum of the capitulum, and their capitula are smaller (only occasionally attaining 1·25 cm. in diameter) without the spines in *C. solstitialis*.—C. C. Townsend.

649/A. **Arisarum proboscideum** (L.) Savi, 1816, *Mem. Acad. Pistojese*, 6; **1816** *Arum proboscideum* L., 1763, *Sp. Plant.*, ed. 2, **2**, 1317. V.c. 9, Dorset hedgerow just north of Dorchester, 1964, A. E. Mc. R. Pearce (*Hb. Mus. Brit.*).

Perennial herb with a creeping rhizome, producing 1-3 leaves sheathing at the base. Petiole of leaf cylindric, c. 15 cm. long. Leaf blade 7·5-12 cm. long, 2·5-6 cm. wide, hastate, with margins ± recurved. Scape of inflorescence usually less than half the length of the petiole, stout, with a single basal sheath. Spathe a broadly cylindric tube, c. 2·5-3 cm. long, inflated; greyish-white below, horizontal and decurved olive-green above. The upper part of the spathe is narrowed into a filiform appendage (proboscis), decurved at the base, becoming erect at the apex. Mouth of spathe small, deep olive-purple. Spadix is included, narrowly cylindric, ending in a curved, obtuse club. Flowers unisexual; female flowers few, each being composed of 1 pistil; male flowers, consisting of 1 stamen, are situated above.

A rare native of Italy, growing in shaded woods of the upper Arno and the Apennines. Introduced into cultivation during the middle of the nineteenth century.—A. MELDERIS.

663/55. CAREX APPROPINQUATA Schumacher. V.c. 45, Pembroke; in an acid fen pool on Dowrog Common, St. David's, 1963, B.S.B.I. FIELD MEETING, det. B. SEDDON (*Herb. Nat. Mus. Wales*, T.A.W.D. 63/687).

A tussock sedge similar in general appearance and habit to *Carex paniculata*, with which it was associated, but differing in that the plants are smaller, the narrower leaves are only 2 mm. wide and the inflorescences are short and compact, 3-4 (-6) cm. long with sessile spikes. The inflated plano-convex fruit has rather few truncate teeth at the angles, the beak less broadly winged and less deeply notched than in *C. paniculata*. The drawings in Clapham, Tutin and Warburg (1962) and Roles (1965) do not well represent it. It was found during a B.S.B.I. field meeting on June 15th, 1963, in a large shallow pool near Maendewi Farm on Dowrog Common, St. David's.

The plants formed an open community with more numerous tussocks of *C. paniculata*: at least two dozen plants of *C. appropinquata* were present. The latter is described in Clapham, Tutin and Warburg (1962) as a plant of "fens and damp places on base-rich peaty soils". The flora of the pool suggests that it is acid but by no means deficient in bases: it may be described as an acid fen pool. The dominant plants are *Menyanthes trifoliata* and *Equisetum fluviatile* and associated species include *Caltha palustris, Viola palustris, Lotus pedunculatus, Filipendula ulmaria, Potentilla palustris, Lythrum salicaria, Epilobium hirsutum, Polygonum amphibium, Veronica scutellata, Mentha aquatica, Galium palustre, Lycopus europaeus, Baldellia ranunculoides, Alisma plantago-aquatica, Potamogeton natans, P. polygonifolius, P. gramineus, Iris pseudacorus, Dactylorhiza praetermissa, Sparganium erectum, Typha latifolia, Eriophorum angustifolium, Eleocharis palustris* and *Carex echinata*. Until recently there were considerable areas of open water at all seasons but in the preceeding two or three years emergent vegetation had spread so that in June 1963 it covered practically the whole surface of the pool.

The record is new both for the vice-county and for Wales. It is surprising that so conspicuous a plant should have hitherto escaped notice in a locality well explored by a number of well known botanists since the beginning of the present century. *Carex appropinquata* is a member of the Northern Continental Element of the British Flora (Matthews, 1955) and in the British Isles has a disjunct distribution now confined to Suffolk, Norfolk, Cambridge, south-east and mid-west Yorkshire in England and to Westmeath in Ireland, with pre-1930 records from *Middlesex, Hertfordshire and Buckinghamshire and from Co. Clare, Ireland (Perring and Walters, 1962). It is recorded in Clapham, Tutin and Warburg (1962) also from Derbyshire, Peebles and Mull. The Welsh station fills an interesting gap in its known distribution.

We are grateful to Dr. A. Melderis for confirming the determination.

REFERENCES

Clapham, A. R., Tutin, T. G. & Warburg, E. F., 1962, *Flora of the British Isles*. Edition 2. Cambridge.
Matthews, J. R., 1955, *Origin and Distribution of the British Flora*. London.
Perring, F. H. & Walters, S. M., 1962, *Atlas of the British Flora*. London.
Roles, S. J., 1965, *Flora of the British Isles, Illustrations Part IV, Monocotyledones*. Cambridge.

—B. Seddon & T. A. W. Davis.

**C. appropinquata* was gathered in Middlesex by J. E. Lousley in 1936, but is now extinct there.—Ed.

PLANT RECORDS

Compiled by E. C. Wallace

"Plant Records" are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1964.

The following signs are used:—

- § before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*
- † before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.
- † before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.
- * before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.* Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*
- ‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.
- [ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§21/6. Dryopteris carthusiana (Villar) H. P. Fuchs. *77, Lanark; Woods at Stonehouse, S. W. Birnage.

§25/i. Polypodium interjectum Shivas. 67, Northumberland, S.; Hareshaw Burn and Chapel Wood, Morpeth, 1962: *68, Cheviotland; Ratcheugh, 1962, G. A. Swan and M. Swan, all det. F. H. Perring.

46/17. Ranunculus omiophyllus Ten. (*R. lenormandii* F. W. Schultz). 98, Argyll; Black Lynn Burn, Oban, P. Macpherson, conf. R. W. Butcher.

†47/1. Adonis annua L. 32, Northants; among crops, Southorpe, 1961, J. H. Chandler, comm. Mrs. G. M. Gent.

†58/7. Papaver lateritium C. Koch. *33, E. Glos.; roadside verge on A.44 road near its junction with A.424 road, far from any dwelling and apparently well established, Mrs. B. H. S. Russell, comm. D. E. de Vesian.

§†76/2. HIRSCHFELDIA INCANA (L.) Lagr.-Foss. *85, Fife; railway siding, Invertiel, Kirkcaldy, casual, 1959-62; disappeared when the rails were lifted, G. H. BALLANTYNE.

§84/1. THLASPI ARVENSE L. *98, Argyll; two plants in fruit on waste land by the shore of Loch Gilp, Lochgilphead, 1965, P. W. WILBERFORCE.

§84/3. THLASPI PERFOLIATUM L. *†6, N. Som.; grassy railway embankment, Charlton Mackrell, 1965, C. A. HOWE, conf. D. P. YOUNG.

113/7×4. VIOLA LACTEA × RIVINIANA. 45, Pemb.; on rough disturbed ground, Trefeidden Moor, St. David's, T. A. W. DAVIS, conf. B. SEDDON.

§129/1. SAPONARIA OFFICINALIS L. *†77, Lanark; Primrose Hill, Stonehouse, one colony, S. W. BIRNAGE.

§133/3. STELLARIA PALLIDA (Dumort.) Piré. *82, Haddington; sandy track near car-park, Dirleton, 1963, M. MCCALLUM WEBSTER, conf. A. O. CHATER.

†141/6. ARENARIA BALEARICA L. 85, Fife; walls of ruin, Wemyss Castle, 1960, G. H. BALLANTYNE. 96b, Nairn; old wall, Kinsteary, M. MCCALLUM WEBSTER.

§†149/3. MONTIA SIBIRICA (L.) Howell. ‡10, Wight; Luccombe, 1962, E. Newnham (1964, *Proc. Isle of Wight N.H. & Arch. Soc.*, **5**, 318). *96b, Nairn; near Ferness school; junction of Ardesier road, two miles west of Nairn, M. MCCALLUM WEBSTER.

160/f. SALICORNIA FRAGILIS P. W. Ball & Tutin. 101, Kintyre; near the Causeway, Danna, A. G. KENNETH and D. MCCLINTOCK, det. T. G. TUTIN.

§†168/3. GERANIUM ENDRESSII Gay. *85, Fife; colony in short grass near ruin, Balmuto, Auchertool, 1962, G. H. BALLANTYNE.

§†170/4. OXALIS EUROPAEA Jord. *85, Fife; old garden, Raith, Kirkcaldy, 1963, G. H. BALLANTYNE.

§†170/6. OXALIS ARTICULATA Savigny. *59, S. Lancs.; dunes, Formby-Altcar Range, known here for c. 30 years, E. HARDY (as *O. floribunda* Lehm.).

§†171/4. IMPATIENS GLANDULIFERA Royle. *85, Fife; colony at Waukmill Den, Crombie, G. H. BALLANTYNE.

§187/2. ULEX GALLII Planch. *107, E. Sutherland; roadside a few miles south of Forsinard, 1963, M. MCCALLUM WEBSTER, det. P. M. BENOIT.

§192/19. TRIFOLIUM FRAGIFERUM L. *†79, Selkirk; wool-tip, Galashiels, 1963, M. MCCALLUM WEBSTER.

§†203/2. CORONILLA VARIA L. *85, Fife; colony on railway embankment, Auchertool, 1960, G. H. BALLANTYNE.

206/9. VICIA OROBUS DC. 78, Peebles; Cowies Linn, 1965, D. MCCOSH.

§206/16. VICIA LATHYROIDES L. *101, Kintyre; Crinan Ferry North, A. G. KENNETH.

†216/2. GEUM MACROPHYLLUM Willd. 99, Dunbarton; waste land by sea, opposite Post Office, Kilgrennan, D. A. PEADON, comm. M. MCCALLUM WEBSTER. 106, E. Ross; roadside near Maryburgh: roadside near Tore, M. MCCALLUM WEBSTER.

§†219/1. AREMONIA AGRIMONOIDES (L.) DC. *85, Fife; Raith Estate, Kirkcaldy, a thriving colony, 1956, G. H. BALLANTYNE.

220/1. ALCHEMILLA ALPINA L. 95, Moray; gravel bed, Culbin Forest, A. SOUTAR, comm. M. MCCALLUM WEBSTER.

223/1. POTERIUM SANGUISORBA L. †76, Renfrew; embankment of disused railway, Barrhead, 1963; very rare in Renfrew and no recent record from the vice-county, B. W. Ribbons (1964, *Glasgow Nat.*, **18**, 381).

§†227/2. COTONEASTER SIMONSII Bak. *85, Fife; cliff-top, Kinghorn Ness, 1962, G. H. BALLANTYNE.

§†227/4. COTONEASTER MICROPHYLLUS Wall. ex Lindl. *85, Fife; sea-cliff, Pettycur, Kinghorn, 1961, G. H. BALLANTYNE.

†237/h. CRASSULA HELMSII (T. Kirk) Cockayne. 14, E. Sussex; dew-pond or bomb-crater on downs above Newhaven, possibly planted or accidentally introduced with water-lilies, 1965, W. H. SPREADBURY, comm. E. B. BANGERTER.

†239/5×4. SAXIFRAGA × URBIUM D. A. Webb (*S. spathularis* × *umbrosa*). 96, Easterness; wood by burn, Auchnagairn, Kirkhill, 1963, M. MCCALLUM WEBSTER, det. at KEW. 106, E. Ross; lane behind Craigton House, Kessock, 1963, M. MCCALLUM WEBSTER, det. at KEW.

§242/2. CHRYSOSPLENIUM ALTERNIFOLIUM L. *78, Peebles; by Water of Quair, 1965, D. MCCOSH.

§†254/6. EPILOBIUM ADENOCAULON Hausskn. *83, Edinb. Garden weed, Howard Place, Edinburgh, 1960, G. H. BALLANTYNE, conf. at ROY. BOT. GARD., EDINBURGH; railway-tip, Borthwick, 1963, M. MCCALLUM WEBSTER, det. at KEW. *85, Fife; by stream in Raith, near Kirkcaldy, 1959, G. H. BALLANTYNE, conf. at ROY. BOT. GARD., EDINBURGH.

§†254/13. EPILOBIUM NERTERIOIDES Cunn. *85, Fife; naturalised in Blairadam Forest, Kelty, 1960, G. H. BALLANTYNE.

§258/1×3. CIRCAEA × INTERMEDIA Ehrh. ‡67, Northumberland, S.; Allen at Allen Banks; near Staward station, 1963; Snope Burn, 1964, G. A. SWAN and M. SWAN. For earlier record see *Top. Bot. Suppl.*, **1**.—ED.

294/1. PIMPINELLA SAXIFRAGA L. 98, Argyll; marshy ground between Dunstaffnage Bay and Camus Bruarich Ruaidbe, Oban, P. MACPHERSON.

§306/1. LIGUSTICUM SCOTICUM L. ‡91, Kincardine; among Marram grass, St. Cyrus, 1963, B. W. Ribbons (1964, *Glasgow Nat.*, **18**, 331).

§320/b. POLYGONUM BOREALE (Lange) Small. *107, E. Sutherland; shingle by sea, Golspie, 1962, M. MCCALLUM WEBSTER, det. B. T. STYLES.

§†320/20. POLYGONUM SACHALINENSE F. Schmidt. *85, Fife; Raith Estate, Kirkcaldy, originally planted but now ± naturalised, 1962, G. H. BALLANTYNE.

§†320/21. POLYGONUM POLYSTACHYUM Wall. ex Meisn. *85, Fife, old estate at Dunniker, Kirkcaldy, originally planted but now ± naturalised, 1962, G. H. BALLANTYNE.

†320/22. POLYGONUM CAMPANULATUM Hook. f. 101, Kintyre, waste ground by the shore, Tayvallich, J. N. MILLS, det. J. W. FRANKS.

†325/5. RUMEX ALPINUS L. 96b, Nairn; verge to road near farm, Glenferness Bridge, M. MCCALLUM WEBSTER.

†331/1. FICUS CARICA L. 85, Fife; a small tree on a cliff-face, Ravenscraig, Kirkcaldy, 1962, G. H. BALLANTYNE.

335/2b. BETULA PUBESCENS subsp. ODORATA (Bechst.) E. F. Warb. 95, Moray; fixed dunes near the sea west of Buckie Loch, Culbin, M. MCCALLUM WEBSTER.

§360/1. ORTHILIA SECUNDA (L.) A. Gray. *111, Orkney; Rousay, 1963, B.S.B. FIELD MEETING.

§362/1. MONOTROPA HYPOPITYS L. ‡58, Chester; old oak wood, Hooton, seven flower spikes, 1964, E. Hardy (1964, *Liverpool Daily Post*, 22 June 1964).

371/1. TRIENTALIS EUROPAEA L. 77, Lanark; Quothquhan House, under pine trees, 1962, Lady ERSKINE HILL, conf. and comm. D. MCCOSH.

§387/1. NYMPHOIDES PELTATA (S. G. Gmel.) Kuntze *†95, Moray; small pool among *Ulex*, covered dunes near Greens, south of Lossiemouth, R. RICHTER, comm. M. MCCALLUM WEBSTER.

†392/2. SYMPHYTUM ASPERUM Lepech. 82, Haddington; Dunglas, a small colony, E. P. BEATTIE and U. K. DUNCAN, conf. A. E. WADE.

§400/10. MYOSOTIS RAMOSISSIMA Rochel. *96b, Nairn; dunes, Nairn Dunbar golf course, M. MCCALLUM WEBSTER.

401/3. LITHOSPERMUM ARVENSE L. *79, Selkirk; wool-tip, Galashiels, 1960, M. MCCALLUM WEBSTER.

§†406/p. CALYSTEGIA PULCHRA Brummitt & Heywood. ‡10, Wight; Cowes, 1962, Rev. Father Higgins (1964, *Proc. Isle of Wight N.H. & Arch. Soc.*, **5**, 319). *33, E. Glos.; in the hedge bordering the Cheltenham-Stow road (A436) above Naunton Village, D. E. de VESIAN.

†420/2. Linaria purpurea (L.) Mill. 79. Selkirk; lane leading to rubbish-tip, Galashiels: 95, Moray; rubbish-tip, Elgin. M. McCallum Webster.

§421/1. Chaenorhinum minus (L.) Lange. *106, E. Ross; railway line, Conon Bridge, 1962, C.S.S.F. Field Meeting, comm. U. K. Duncan.

†428/1. Erinus alpinus L. 85, Fife; wall of ruin, Piteadie Castle, Kirkcaldy, G. H. Ballantyne.

§430/3. Veronica catenata Pennell. *85, Fife; Kinghorn Loch, 1957, E. P. Beattie and G. H. Ballantyne.

§†430/18. Veronica praecox All. *22, Berks.; Near Witney, 20-30 plants, G. A. Maclean, conf. H. J. M. Bowen and D. H. Kent.

§†430/22. Veronica polita Fr. *96b, Nairn; garden weed, Kinsteary, Auldearn, M. McCallum Webster.

§435/1(1). Euphrasia micrantha Reichb. 67, Northumberland, S.; Holystone, 1948, W. E. Foster, det. P. F. Yeo: Risey Burn, 1959, G. A. Swan and M. Swan, det. P. F. Yeo. *68, Cheviotland; Debdon, 1961, G. A. Swan and M. Swan, det. P. F. Yeo.

§435/1(2). Euphrasia scottica Wettst. *67, Northumberland, S.; N. Tyne, near the Eals, 1962; Glendue Burn, 1962a; Tarrett Burn, 1963; Kielder Burn, 1964: *68, Cheviotland; Bizzle, Cheviot, 1961; Goldscleugh, Cheviot, G. A. Swan and M. Swan, all det. P. F. Yeo.

§435/1(4). Euphrasia frigida Pugsl. *68, Cheviotland; Hen Hole, Cheviot, at 1,600-2,100 ft., 1961, G. A. Swan and M. Swan, det. P. F. Yeo.

§435/1(18). Euphrasia brevipila Burnat & Gremli. *67, Northumberland, S.; Catcleugh, 1961; Lewis Burn; Akenshaw Burn, 1961: *68, Cheviotland; Newton Sea Houses, 1960; Hen Hole, Cheviot, 1962, G. A. Swan and M. Swan, all det. P. F. Yeo.

§435/1(19). Euphrasia rostkoviana Hayne. *67, Northumberland, S.; Irthing, south-east of Padderburn, 1960; Bateinghope Burn, 1960; Kielder, 1962, G. A. Swan and M. Swan, det. F. F. Yeo. 101, Kintyre; grassland, Danna, A. G. Kenneth, det. P. F. Yeo, as "*E. rostkoviana*, introgressed form ? × *confusa*".

§435/1(20). Euphrasia montana Jord. *67, Northumberland, S.; Knar Burn, 1963; Swinhope Burn, 1964, G. A. Swan and M. Swan, det. P. F. Yeo.

§440/8. Orobanche minor Sm. *85, Fife; old railway line near Invertiel, Kirkcaldy, 16 plants in 100 yards stretch, 1961, G. H. Ballantyne.

§455/5. Salvia verbenaca L. *†79, Selkirk; wool-tip, Galashiels, 1963, M. McCallum Webster, det. at Kew.

†475/10. CAMPANULA ALLIARIIFOLIA Willd. ‡3, S. Devon; Hurberton, Whitely, railway bank, north side, 1948, E. M. Phillips, det. A. J. Wilmott (1964, *Rep. & Trans. Devon. Assoc.*, **96**, 83).

§†506/4. SENECIO SQUALIDUS L. ‡H.39, Antrim; see Plant Notes, *Proc. B.S.B.I.*, **6**, 51 (1965).—ED.

†516/1. ANAPHALIS MARGARITACEA (L.) Benth. 85, Fife; now extinct at St. Davids, E. P. BEATTIE. Abundant on railway embankment east of Aberdour, 1961, G. H. BALLANTYNE and E. P. BEATTIE. Small colony near Port Laing, Inverkeithing, E. P. BEATTIE.

§†532/2. MATRICARIA MATRICARIOIDES (Less.) Porter. *81, Berwick; about Cockburnspath, Coldingham and throughout the vice-county, 1956→, E P. BEATTIE.

†535/2. ARTEMISIA VERLOTORUM L. 24, Bucks.; rubbish-tip, Burnham Beeches since 1954, A. F. Wood (1964, *Middle-Thames Nat.*, **15**, 29).

§539/1. CARDUUS TENUIFLORUS Curt. *†79, Selkirk; wool-tip, Galashiels, 1960, M. MCCALLUM WEBSTER. For an earlier record see HAYWARD, I. M. & DRUCE, G .C., *Adventive Flora of Tweedside* (1919), 146.—ED.

540/7×3. CIRSIUM × WANKELII Reichardt. 96, Easterness; clump by main road (A9) south of Kingussie, B. M. C. MORGAN and M. MCCALLUM WEBSTER.

§550/3. LEONTODON TARAXACOIDES (Vill.) Mérat. *101, Kintyre; shore at Ballygroggan, A. G. KENNETH.

§†557/3. CICERBITA MACROPHYLLA (Willd.) Wallr. *85, Fife; roadside near rubbish-tip, Boreland, Kirkcaldy, 1957, G. H. BALLANTYNE. *98, Argyll; damp ground by Loch Etive, luxuriant and spreading, J. N. MILLS, det. J. W. FRANKS.

§†558/2(3). HIERACIUM LACTUCELLA Wallr. ‡21, Middx.; Harrow, F. C. Studley (1965, *Lond. Nat.*, **44**, 13).

§†558/2(5). HIERACIUM FLAGELLARE Willd. *84, Linlithgow; waste ground Carriden, Bo'ness, E. P. BEATTIE and U. K. DUNCAN, det. P. D. SELL and C. WEST.

§†558/2(8). HIERACIUM BRUNNEOCROCEUM Pugsl. *78, Peebles; Rachan near Broughton, 1958→; *79, Selkirk; roadsides and grassy places about Galashiels: *83, Edinburgh; disused railway line, Davidson Mains, Edinburgh, 1958→ : *84, Linlithgow; waste ground, Carriden, Bo'ness, E. P. BEATTIE.

§†558/2(9). HIERACIUM PRAEALTUM Vill. ex Gochnat. ‡75, Ayr; near Hurlford, 1963, R. Prasher (1964, *Glasgow Nat.*, **18**, 382).

§†558/2(10). HIERACIUM ARVORUM (Naeg. & Peter) Pugsl. *84, Linlithgow; waste ground, Carriden, Bo'ness, E. P. BEATTIE and U. K. DUNCAN, det. P. D. SELL and C. WEST.

§536/2. ALISMA LANCEOLATUM With. ‡77, Lanark; in considerable quantity in the river Clyde, opposite Carmyle, 1962, and in a second station some distance from the north bank, 1963, A. A. Percy, det. R. Mackechnie (1964, *Glasgow Nat.* **18**, 383).

§576/2. ZOSTERA ANGUSTIFOLIA (Hornem.) Reichb. *101, Kintyre; lagoons at Causeway, with *Z. marina*, A. G. KENNETH and D. MCCLINTOCK, det. T. G. TUTIN.

589/3. POLYGONATUM MULTIFLORUM (L.) All. 59, S. Lancs.; extensive colonies, east side of Paddock Wood, Scarisbrick Hall Park, since pre-1939, E. HARDY. †95, Moray; established by a small burn west of Coinicaval, M. MCCALLUM WEBSTER.

§†605/2. JUNCUS TENUIS Willd. ‡65, N.-W. York; side of stream, Gunnerside village, Yorks. Nat. Union Field Meeting (1965, *The Nat.*, **1965**, **24**).

605/14. JUNCUS MARITIMUS Lam. 61, S.-E. York; along canal at Kilnsea at the northern part of Spurn Point, E. Crackles (1965, *The Nat.*, **1965**, 26).

§†607/10. ALLIUM TRIQUETRUM L. ‡H.39, Antrim; Drains Bay, 1932, R. H. Common (1932, *Irish Nat. J.*, **4**, 99: see also *Irish Nat. J.*, **15, 21** (1965)).

§611/2. LEUCOJUM AESTIVUM L. ‡†H.22, Meath; marshy ground by the river Boyne, Oldbridge, above Drogheda, D. M. Synnott (1965, *Irish Nat. J.*, **15**, 81).

§625/6. EPIPACTIS PHYLLANTHES G. E. Sm. *21, Middx.; old chalkpit, Harefield, 1965, B. P. PICKESS, det. D. P. YOUNG (as var. *degenera*), comm. D. H. KENT. ‡57, Derby and ‡63, S.-W. York; on both sides of the Yorkshire-Derby border east of Sheffield, C. B. Waite, Miss Shaw and Miss Sollitt (1965, *The Nat.*, **1965**, 26).

642/7. ORCHIS MASCULA (L.) L. 78, Peebles; rock ledges, Gameshope Burn, 1965, D. MCCOSH.

§643/1. DACTYLORHIZA FUCHSII (Druce) Soó. *77, Lanark; Tileworks Park, Stonehouse, S. W. BIRNAGE.

§649/2. ARUM ITALICUM subsp. NEGLECTUM (Townsend) Prime. *85, Fife, by walls in old estate at Balmuto, Auchtertool, originally planted but now well naturalised, 1961, G. H. BALLANTYNE, det. C. T. PRIME.

§653/1. TYPHA LATIFOLIA L. *78, Peebles; edge of pool, Lochurd, 1962, T. H. BELL, conf. and comm. D. MCCOSH.

§655/3. SCIRPUS MARITIMUS L. *111, Orkney; Bay of Tuquoy, 1963, B.S.B.I. FIELD MEETING.

§658/1. CYPERUS LONGUS L. ‡†3, S. Devon; Ottery St. Mary, 1963, J. Haywood (1964, *Rep. & Trans. Devon. Assoc.*, **96**, 84).

663/1. CAREX LAEVIGATA Sm. 78, Peebles; Cowies Linn, 1965, D. McCOSH.

663/32. CAREX HIRTA L. 78, Peebles; Blyth Bridge, 1965, D. McCOSH.

663/54. CAREX PANICULATA L. 96, Easterness; several tussocks on east bank of Loch Morlich, A. SOUTAR, comm. M. McCALLUM WEBSTER.

§663/55. CAREX APPROPINQUATA Schumacher. *45, Pemb.; see Plant Notes, p. 126.—**Ed.**

670/2×671/1. ×FESTULOLIUM HOLMBERGII (Dorfl.) P. Fourn. 33, E. Glos.; open hillside, Dunns Hill, Winchcombe, 1963, R. DUDLEY-SMITH, conf. D. M. BARLING.

§676/4. POA ALPINA L. *111, Orkney; Hoy, 1963, B.S.B.I. FIELD MEETING.

§681/1. MELICA UNIFLORA Retz. *101, Kintyre; roadside, Ardrishaig-Tarbert (Meall Dubh), A. G. KENNETH.

§685/1. AGROPYRON CANINUM (L.) Beauv. *101, Kintyre; Inverneil Burn ravine, A. G. KENNETH.

§685/5. AGROPYRON JUNCEIFORME (A. & D. Löve) A. & D. Löve. *98, Argyll; west end of Tralee Bay, A. G. KENNETH, det. E. C. WALLACE.

693/2. HELICTOTRICHON PUBESCENS (Huds.) Pilg. 78, Peebles; rocky knoll, Blyth Bridge, in small quantity, D. McCOSH.

696/2. DESCHAMPSIA ALPINA (L.) Roem. & Schult. 97, Westerness; Garbh Bheinn (Sron a Gharbh), A. G. KENNETH, conf. M. D. HOOPER.

§700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. ‡98, Argyll; Craignash, 1963, A. McG. Stirling (1964, *Glasgow Nat.*, **18**, 383).

709/1. MILIUM EFFUSUM L. Kintyre; several plants on a shady wooded bank near the Crinan Hotel, north-west end of the Crinan Canal, 1965, P. W. WILBERFORCE.

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to D. E. Allen and E. B. Bangerter for their assistance.

SYSTEMATIC, ETC.

CHARACEAE. Corillion R. & Guerlesquin, M., 1965, Contribution à l'étude des végétations de Charophycées d'Italie péninsulaire (étage méditerranéen), *Bull. Soc. Sci. Bretagne*, **88**, 193-211. Species of *Nitella, Tolypella, Nitellopsis* and *Chara* are studied systematically, ecologically and phytogeographically. The most characteristic association, *Chareto-Tolypelletum*, of alkaline-saline conditions, is described.—[E.B.B.]

CHARA ACULEOLATA Kütz. Corillion, R., 1964, Interprétation et subdivision de l'espèce Chara aculeolata Kütz. Distribution géographique, *Bull. Soc. Sci. Bretagne*, **87**, 211-222. *Chara aculeolata* has been variously treated in charological literature. A study of this and allied species shows that it combines the two old taxa *C. intermedia* A.Br. and *C. polyacantha* A.Br. —[E.B.B.]

5→ PTEROPSIDA. Sorsa, P., 1964, Studies on the spore morphology of Fennoscandian fern species, *Ann. Bot. Fenn.*, **1**, 179-201. The spores of 35 Fennoscandian fern species are described and their application to species identification is discussed.—[D.H.K.]

5→ PTEROPSIDA. Wagner, W. H., 1964, Assessment of species relationships in the Filicineae, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 147-148.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Kirkwood, R. C. & Fletcher, W. W., 1964, Studies on the control of bracken (Pteridium aquilinum) using foliar-applied translocated herbicides, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 401.

9/1. CRYPTOGRAMMA CRISPA (L.) R.Br. ex Hook. Momose, S., 1964, The prothallium of Cryptogramma group of ferns, *J. Jap. Bot.*, **39**, 305-312.

14. PHYLLITIS. Emmott, J. I., 1964, A cytogenetic investigation in Phyllitis-Asplenium complex, *New Phyt.*, **63**, 306-318. Details are given of experimental studies on diploid and tetraploid forms of various *Phyllitis* species, and of synthetic hybrids between *Phyllitis* and *Asplenium* species. —[D.H.K.]

15. ASPLENIUM. Vida, G., 1964, Cytogenetical studies in Asplenium hybrids found in Hungary, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 500.

15. ASPLENIUM.—See 14. PHYLLITIS.

*15/5. ASPLENIUM TRICHOMANES L. Benoit, P. M., 1964, The two types of Asplenium trichomanes, *Nature in Wales*, **9**, 75-79. Notes on *Asplenium trichomanes* L. subsp. *trichomanes* and *A. trichomanes* subsp. *quadrivalens* D. E. Meyer emend. Lovis in Merioneth. The two subspecies are figured and their different characters given.—[D.H.K.]

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*See Plant Notes.—ED.

20. Woodsia. Brown, D. F. M., 1964, A monographic study of the fern genus Woodsia, *Beih. Nova Hedw.*, **16**, x+154+40 plates.

21. Dryopteris. Wagner, W. H. Junr. & Chen, K. L., 1965, Abortion of spores and sporangia as a tool in the detection of Dryopteris hybrids, *Amer. Fern J.*, **55**, 9-29.

21/4. Dryopteris villarii (Bellardi) Woynar. Panigrahi, G., 1965, Preliminary studies in the cytotaxonomy of the Dryopteris villarsii (Bell.) Woynar complex in Europe, *Amer. Fern J.*, **55**, 1-8. *Dryopteris villarii* is a variable species in Europe, and descriptions are given of a diploid ($n=41$) from France and a tetraploid ($2n=82$) from England. The two plants were crossed artificially and the resultant hybrid proved to be intermediate between the parents. The author concludes that it is likely that the diploid and tetraploid forms will have to be treated as separate species.—[D.H.K.]

24/P. Pteris. Walker, T. G., 1962, Cytology and evolution in the fern genus Pteris, *Evolution*, **16**, 27-43.

25. Polypodium. Lenski, I., 1964, Merkmalsprufüngen an den europäischen Zytotypen von Polypodium vulgare L. s. lat., *Flora*, **154**, 245-266.

25. Polypodium. Vida, G., 1963, The biosystematics of the Hungarian Polypodium vulgare s.l., *Acta Bot. Sci. Hung. Suppl.*, **5**. 26-27. *Polypodium interjectum* and *P. interjectum* × *vulgare* are reported from Hungary.—[D.H.K.]

36. Ranunculaceae. Leppik, E., 1964, Floral evolution in the Ranunculaceae, *Iowa State Coll. J. Sci.*, **39**, 1-101.

49. Aquilegia. Gajewski, W. & Prazmo, W., 1964, The genetic basis of specific differences in Aquilegia, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 133-134.

67→ Cruciferae. Grandin, M., 1964, Contribution à l'étude anatomique des plantules de Crucifères, *Bull. Soc. Linn. Normandie*, **5**, 99-105. Studies of the vascularisation of seedlings of some *Cruciferae* have revealed a very general homogeneity. The few cultivated species studied include *Raphanus sativus*, *Sinapis alba*, *Lunaria biennis* and *Brassica oleracea*.—[E.B.B.]

67→ Cruciferae. Mulligan, G. A., 1964, Chromosome numbers in the family Cruciferae, 1, *Canad. J. Bot.*, **42**, 1509-1519. The following chromosome numbers are reported from Canadian material:— *Alyssum alyssoides*, $n=16$; *Arabidopsis thaliana*, $n=10$; *Arabis albida*, $n=8$; *A. alpina*, $2n=16$; *A. hirsuta*, $2n=32$; *Cakile edentula*, $2n=18$; *Rorippa microphylla*, $2n=64$; *R. islandica*, $2n=32$, and *Turritis glabra*, $2n=12$.—[D.H.K.]

67/1. Brassica oleracea L. Day, V. F. P., 1965, Notes on Brassica oleracea, *Bull. Kent F.C.*, **3**, 1-3.

70/2. Sinapis alba L. Bernier, G. & Bronchart, R., 1964, The steps of floral induction in a long-day plant, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 333.

79. Lepidium. Boelcke, O., 1964, Notas sobre especies de Lepidium de la Argentina, *Darwiniana*, **13**, 506-528. Notes on a number of species of *Lepidium* found in Argentina, some of which have occurred as adventives in Britain. A few new species are described.—[D.H.K.]

85/1. TEESDALIA NUDICAULIS (L.) R. Br. Newman, E. I., 1965, Factors affecting the seed production of Teesdalia nudicaulis, 2. Soil moisture in spring, *J. Ecol.*, **53**, 211-232.

85/1. TEESDALIA NUDICAULIS (L.) R. Br. Prasher, R., 1964, Shepherd's Cress (Teesdalia nudicaulis) in an unusual habitat, *Glasgow Nat.*, **18**, 380. In 1948 the writer discovered *Teesdalia nudicaulis* growing on a pit bing (heap) near Daltry, Ayrshire. In recent years he has found the plant on other pit bings in the neighbourhood.—[D.H.K.]

86/1. CAPSELLA BURSA-PASTORIS (L.) Medic. Helbaek, H., 1964, First impressions of the Catal Hüyük plant husbandry, *Anatolian Studies*, **14**, 121-123. In the course of excavations at the very rich Neolithic site of Catal Hüyük, an ancient centre of the obsidian trade in southern Turkey, seeds of *Capsella bursa-pastoris* have been found in a level radiocarbon-dated 5800-6100 B.C. Highly oleaginous and probably a source of plant fat equivalent to ancient cultivation of *Linum* in more easterly areas, they are regarded as evidence that crop weeds were being used to supplement the local diet.—[D.E.A.]

88/6. COCHLEARIA ANGLICA L. Binet, P., 1965, Action de la température et de la Salinité sur la germination des graines de Cochlearia anglica L., *Rev. Gen. Bot.*, **72**, 221-236.

94. DRABA. Merxmueller, H. & Buttler, K. P. 1964, Die Chromosomenzahlen der mitteleuropäischen und alpinen Draben, *Ber. Deutsch. Bot. Ges.*, **77**, 411-415.

97/2. CARDAMINE AMARA L. Habeler, E., 1963, Cytotaxonomie von Cardamine amara des Alpen-Ostrandes, *Phyton*, **10**, 161-205.

105. ERYSIMUM. Favarger, C., 1964, Recherches cytotaxonmiques sue quelques Erysimum, *Ber. Schweiz. Bot. Ges.*, **74**, 5-40. The cytology of several species of *Erysimum* are investigated and chromosome numbers tabulated. Arising from these investigations a few nomenclature changes have been made.—[E.B.B.]

113. VIOLA. Dizerbo, A. H., 1964, La floraison vernale et automnale des Viola sec. Nominium Ging. du Massif Armoricain, *Bull. Soc. Bot. France*, **111**, 55-60. The date limits of chasmogamic flowering of *Viola* species of the section *Nominium* in the Breton Massif are established. Most species have not only a spring but also an autumnal flowering. The latter is seldom noted in Europe but the conditions of its induction, seemingly dependent on local climatic conditions, remain to be confirmed. —[Author's summary, translated by E.B.B.]

113. VIOLA. Russel, N. H., 1965, Violets (Viola) of Central and Eastern United States: an introductory survey, *Sida*, **2**, 1-111. *Viola palustris*, though not uncommon in the subalpine zone of the Rocky Mountains, is rare in the eastern United States, and is reported only from the White Mountains of New Hampshire. *V. odorata* and *V. arvensis* are introduced from Europe, the former is now established in lawns and woodlands in the central and eastern United States, while the latter occurs sparingly in, or near, cultivated fields and weedy roadside banks.—[D.H.K.]

113. VIOLA. Schmidt, H. A., 1964, Zytotaxonomische Beiträge zu einer Neugliederung der Sektion Melanium der Gattung Viola, *Ber. Deutsch. Bot. Ges.*, **77**, 94-99.

115/4. HYPERICUM CALYCINUM L. Salisbury, E. J., 1964, The seedling mystery of the Rose of Sharon (Hypericum calycinum), *J. Roy. Hort. Soc.*, **89**, 125-126. Attention is drawn to the apparent absence of self-sown seedlings near established colonies of *Hypericum calycinum*. Poor dispersal from the capsule appears to be one contributory cause. A sample of seed sown by the author after twelve months' storage had 22% germination.—[D.H.K.]

115/11. HYPERICUM PULCHRUM L. Zelený, V., 1965, Hypericum pulchrum L. (trězalka pěkná) v ČSSR, *Preslia*, **37**, 79-83. The distribution of *Hypericum pulchrum* in Czechoslovakia, and the range of the species in Europe is discussed.—[D.H.K.]

123. SILENE. Khoshoo, T. N., et al., 1963, Cytogenetical approach to the taxonomy of Silene conoidea—conica complex, *Proc. Indian Acad. Sci.*, **57 B**, 368-378.

131. CERASTIUM. Mizushima, M., 1963, The genus Cerastium L. in Japan, *Sci. Rep. Tôhoku Univ., Biol., Ser.*, **4**, **29**, 277-294. A revision of *Cerastium* in Japan. A number of the species mentioned occur also in Britain.—[D.H.K.]

143. SPERGULARIA. Ratter, J. A., 1964, Cytogenetic studies in Spergularia, 1. Cytology of the Old World species, *Notes Roy. Bot. Gard. Edinb.*, **25**, 293-302: 1965, 2. An attempt to discover cytogenetic relationships of some species, *loc. cit.*, **26**, 205-223: 3. Some interspecific hybrids involving S. marina (L.) Griseb., *loc. cit.*, **26**, 224-231.

154→ CHENOPODIACEAE. Van Ooststroom, S. J. and Reichgelt, T. J., 1965, Enige voor Nederland nieuwe Chenopodiaceae, *Gorteria*, **2**, 89-93. During his stay at the Rijksherbarium, Leiden, in November, 1963, Dr. Paul Aellen, specialist in Chenopodiaceae, revised most of the Dutch material. As a result of this revision four species of *Chenopodium*, seven hybrids of this genus and two species of *Atriplex* all new to the Dutch flora have been detected.—[D.H.K.]

154. CHENOPODIUM. Aellen, P., 1963, Chenopodium viride in den Ostalpen, *Flora*, **154**, 259-260.

154. CHENOPODIUM. Giusti, L., 1964, Notas cititaxonómicas sobre Chenopodium album L. en Argentina, *Darwiniana*, **13**, 486-505.

154. CHENOPODIUM. Van Ooststroom, S. J. & Reichgelt, T. J., 1965, Nadere gegevens over het voorkamen van Chenopodium chenopodioides (L.) Aellen in Nederland, *Gorteria*, **2**, 87-88. A revision of Dutch material of *Chenopodium* by Dr. Paul Aellen has revealed the occurrence of ten additional localities for *Chenopodium chenopodioides* in the country. The species was first recorded from Holland by the authors in 1956 (*Acta Bot. Neerl.*, **5**, 323).—[D.H.K.]

160/1. SALICORNIA PERENNIS Mill. Benoit, P. M., 1964, The extent of Salicornia perennis in Merioneth in 1964, *Nature in Wales*, **9**, 79-81.

170. OXALIS. Ornduff, R., 1964, Breeding systems of the North American species of Oxalis, section Corniculatae, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 439.

190. MEDICAGO. Kožuharov, S., 1962, Certain wild species of Medick (Medicago) widespread in Bulgaria, *Mitt. Bot. Inst. Sofia*, **10**, 37-46.

190. Medicago. Bondev, I. & Kožuharov, S., 1963, Beitrag zur näheren Bestimmung der Arten-zusammensetzung der Gattung Medicago L. in Bulgarien, *Mitt. Bot. Inst. Sofia*, **11**, 159-163.

195. Lotus. Grant, W. F., 1964, Biosystematic studies in the genus Lotus (Leguminosae), *Tenth Internat. Bot. Congr. Abstr. Pap.*, 373-374.

207. Lathyrus. Tronkovsky, D. A., 1964, Remote hybrids in the genus Lathyrus and their significance in understanding some aspects in the evolution of this genus, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 492-493.

212/5. Potentilla anserina L. Rousi, A., 1964, Biosystematics of the polymorphic species Potentilla anserina, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 458. Material from 46 populations of *Potentilla anserina* were cultivated at Berkeley, California, U.S.A., and Piikiö, Finland. Cytological investigation showed that of these populations, 43 were tetraploid, $2n=28$ and 3 hexaploid, $2n=48$.—[D.H.K.]

215. Fragaria. Beridze, R., 1964, Phylogenetic relations and evolution of the genus Fragaria in the light of new experimental data, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 332-333.

220. Alchemilla. Fröhner, S., 1965, Mitteleuropäische Sippen von Alchemilla glabra und einige Verwandte, *Bot. Jahrb.*, **83**, 370-405. A revision of the *Alchemilla glabra* group in mid-Europe. Three new species are described—*A. libericola* from the Alps, *A. ursina* from the mountains of south-central Europe, and *A. sudetica* from eastern Germany.—[D.H.K.]

223/1. Poterium sanguisorba L. Ribbons, B. W., 1964, Salad Burnet (Poterium sanguisorba) in Renfrewshire, *Glasgow Nat.*, **18**, 381.

224. Acaena. Grondona, E., 1964, Las especies argentinas del género Acaena (Rosaceae), *Darwiniana*, **13**, 209-342. A revision of the species of *Acaena* found in Argentina, with full descriptions, keys, geographical distributions and illustrations.—[D.H.K.]

225/1. Rosa arvensis Huds. Jackson, G. A. D. & Blundell, J. B., 1965, Germination of Rosa arvensis, *Nature*, **205**, 518-519.

226. Prunus. Brun, J., 1965, Observations sur les Prunelliers de la flore d'Alsace, *Bull. Soc. Hist. Nat. Colmar*, **51**, 36-48. Caryological notes on *Prunus* species, particularly *P. spinosa*, *P. fruticans* (a key is provided to distinguish these two) and *P. domestica*.—[E.B.B.]

232. Sorbus. Warburg, E. F., 1964, Apomixis and species problems in European Sorbus, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 114.

235/5. Sedum anglicum Huds. Turesson, G., 1964, Sedum anglicum Huds. på Christiansö, *Bot. Not.*, **117**, 426-427.

242/2. Chrysosplenium alternifolium L. Westhoff, V., 1965, Voorkomen en standplaats van Chrysosplenium alternifolium L. in de duinen van Voorne, *Gorteria*, **2**, 73-77. *Chrysosplenium alternifolium* is a rare species of spring and rivulet habitats in the Netherlands, and a survey of its various habitats and associated species suggests that it may have been originally introduced and has survived as a relic of the "wild garden". It is pointed out, however, that during the nineteenth century it was known at several comparable localities in calcareous dunes near Haarlem where it may have been native. As a consequence of the drying up of the dune area due to water extraction the species is now extinct in this locality.—[D.H.K.]

247. **DROSERA.** Salema, R., 1964, Contribução o estude histo-organográfico do género Drosera, *Rev. Biol.* (Brazil), **4**, 121-130.

253→ **ONAGRACEAE.** Raven, P. H., 1964, Cytology and intergeneric relationships in Onagraceae, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 148.

263/1. **VISCUM ALBUM L.** Hatton, R. H. S., 1965, Pollination of Mistletoe (Viscum album L.), *Proc. Linn. Soc.*, **176**, 67-76. Although mistletoe flowers have some characteristic entomophilous features, and are in fact visited and pollinated by insects, more pollination is brought about by the agency of wind than by insects at least when the male and female plants are in close proximity. There is at present no evidence as to how far apart the plants may be for this to be the case.—[Author's summary.]

299. **SESELI.** Duvigneaud, J., 1965, Le caractère de glabréité des fruits dans le groupe du Seseli libanotis (Umbelliferae), *Bull. Soc. Roy. Bot. Belg.*, **98**, 215-228. The character of smoothness or pubescence of the fruit has only in the group of *Seseli libanotis* a very weak taxonomic value. The author amends the taxonomic treatment and the nomenclature of Thellung and Rouy. He names as follows the different glabrous-fruited forms which are to be found in this group: *Libanotis pyrenaica* (L.) Bourg. ex Nyman subsp. *montana* (Crantz) Lemke & Rothm. f. *callayi* Duvigneaud, f. nov.; *L. pyrenaica* (L.) Bourg. ex Nyman subsp. *pyrenaica* f. *glabra* Duvigneaud, f. nov.; *L. pyrenaica* (L.) Bourg. ex Nyman subsp. *pyrenaica* f. *glabra* Duvigneaud status *maritima*; *L. sibirica* (L.) C. A. Meyer f. *leiocarpa* (Heuffel) Duvigneaud, comb. nov.—[Author's summary.]

306/1. **LIGUSTICUM SCOTICUM L.** Ribbons, B. W., 1964, Scot's Lovage (Ligusticum scoticum) at St. Cyrus, Kincardine, *Glasgow Nat.*, **18**, 381.

315. **BRYONIA.** Brabec, F., 1964, On sex determination in Bryonia, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 337-338.

319. **EUPHORBIA.** Verdus, M.-c., 1964, Les plantules des Euphorbes françaises, *Bull. Soc. Hist. Nat. Toulouse*, **99**, 136-156. Morphological and anatomical studies on the species of *Euphorbia* occurring in France. These confirm that the section *Anisophyllum* (including *E. peplis*) should be maintained and that the section *Tithymalus* (including other British species) may be divided into three groups.—[E.B.B.]

320→ **POLYGONACEAE.** Husson, P., 1964, Quelques cas tératologiques de fleurs de Polygonacées, *Bull. Soc. Hist. Nat. Toulouse*, **99**, 124-135. A study of several cases of anomalies in the flowers of *Rumex* species, *Polygonum* species, and other genera shows a great variability; a revision of the basis of division of the family into trimerous and pentamerous groups is necessary. —[E.B.B.]

320. **POLYGONUM.** Hylander, N., 1964, Om några adventiva Polygonum-arter av gruppen Avicularia, *Bot. Not.*, **117**, 231-237. Three Eurasiatic species of *Polygonum* section *Avicularia* have occurred as adventives in Scandinavia. The most frequent is *P. patulum* Bieb., almost exclusively as the var. *kitaibelianum* (Sadl.) Aschers. & Graebn. *P. pulchellum* Lois. from the Meditteranean region and *P. argyrocoleum* Steud. ex Kuntze from Persia, have also been found.—[D.H.K.]

320. **POLYGONUM.** Nordhagen, R., 1963, Studies on Polygonum oxyspermum Mey. et Bge., Polygonum raii Bab. and P. raii subsp. norvegicum Sam., *Avhandl. Norske Vidensk. Akad. Oslo* **1**, *Mat. Naturv. Kl.*, Ny. ser. No. **5**, 1-40. The distributions of these three taxa are

reviewed. *Polygonum oxyspermum* occurs along the coasts of the Baltic Sea to Denmark and Norway, *P. raii* is found on the coasts of France and the British Isles, and *P. norvegicum* (Sam.) Lid (*P. raii* subsp *norvegicum* Sam.) occurs along the west coast of Norway to Arctic Russia, it is found also over a limited area of the Danish coast.—[D.H.K.]

320. POLYGONUM. Timson, J., 1965, A study of hybridization in Polygonum section Persicaria, *J. Linn. Soc., Bot.*, **59**, 155-161. The author examined 84 herbarium sheets of alleged hybrids of *Polygonum* section *Persicaria*, and by means of a hybrid index showed that at least 71 were referable to species. It is concluded that hybrids in *Polygonum* section *Persicaria* are very rare, and that few are able to reproduce. The most common hybrid met with in the group is *P. mite* × *persicaria*.—[D.H.K.]

322/1. KOENIGIA ISLANDICA L. Dahl, E., 1964, On the heat exchange of a wet vegetation surface and the ecology of Koenigia islandica, *Oikos*, **14**, 190-211.

326. PARIETARIA. Sukopp, H. & Scholz, H., 1964, Parietaria pensylvanica Muhlenb. ex Willd. in Berlin, *Ber. Deutsch. Bot. Ges.*, **77**, 419-426. The history and spread in Berlin of *Parietaria pensylvanica*, a North American species, long established in that city, is discussed.—[D.H.K.]

335. BETULA. Jentys-Szaferowa, J., 1964, Problems connected with the history and evolution of some birches in Europe, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 137.

341. QUERCUS. Yapp, W. B., 1961, Oaks in Scotland, *Scot. Nat.*, **70**, 2-6.

343/h. SALIX HIBERNICA Reching. f. Stelfox, A. W., 1965, Salix hibernica Rechinger f., *Irish Nat. J.*, **15**, 25-29. Notes on the history of *Salix hibernica* in Ireland.—[D.H.K.]

344→ ERICACEAE. Watson, L., 1964, The taxonomic significance of certain anatomical observations on Ericaceae. The Ericoideae, Calluna and Cassiope, *New Phyt.*, **63**, 274-280.

356/1. CALLUNA VULGARIS (L.) Hull.—See 357. ERICA.

359. PYROLA. Krisa, B., 1964, Taxonomic revision of the Pyrola rotundifolia complex in Fennoscandia, *Bot. Not.*, **117**, 397-417. The species in the *Pyrola rotundifolia* complex found in Fennoscandia are *P. intermedia* Schl. which occurs in Sweden, Norway and Finland, and *P. grandiflora* Rad. subsp. *norvegica* (Knab.) Löve & Löve which is found in Sweden and Norway.—[D.H.K.]

359. PYROLA. Krisa, B., 1964, Pyrola intermedia Schl.—ein neues arktisch-alpines Element der tschechoslowackischen Flora, *Nov. bot. Inst. bot. Univ. Carol, Prag.*, **1964**, 29-33.

384/2. GENTIANA VERNA L. Haes, E. C. M., 1962, Spring gentians in England, *Gard. Chron.*, **151**, 231. A short account of the distribution of *Gentiana verna* in England. Details of some associated species are provided.—[D.H.K.]

400. MYOSOTIS. Grau, J., 1964, Die Zytotaxonomie der Myosotis-alpestris- und der Myosotis-silvatica- Gruppe in Europa, *Österr. Bot. Zeitschr.* **111**, 561-617. A revision of the *Myosotis alpestris* and *M. sylvatica* groups in Europe. A number of new combinations are made and a key is provided to the identification of the various taxa. The distributions of species and subspecies are illustrated by maps.—[D.H.K.]

400. MYOSOTIS. Grau, J., 1964, Karyotypphylogenie bei Myosotis, *Ber. Deutsch. Bot. Ges.*, **77**, 99-101.

403/A. AMSINCKIA MENZIESII (Lehm.) Nels. & Macbr. Leys, H. N. & Bannink, J. F., 1965, Amsinckia menziesii (Lehm.) Nels. & Macbr. in een graanveld bij Venray, *Gorteria*, **2**, 105-108. *Amsinckia menziesii*, a North American species, has been found as an adventive in the Netherlands on five occasions since 1913. Its ecology appears to be similar to that of *Lycopsis arvensis*.—[D.H.K.]

407. CUSCUTA. Feinbrun, N. & Taub, S., 1964, The Cuscuta species of Palestine, *Israel J. Bot.*, **13**, 1-23. A revision of *Cuscuta* in Palestine. *Cuscuta epilinum* occurs on *Linum usitatissimum* and is also recorded on *Conium maculatum*. *C. epithymum* (as var. *kotschyi* (Des Moulins) Engelmann) is rare on various dwarf shrubs. *C. campestris*, introduced from North Amercia with alfalfa (*Medicago sativa*) is also recorded on *Epilobium hirsutum* and *Amaranthus graecizans*.—[D.H.K.]

421. CHAENORHINUM. España, T. M. Losa, 1963, Especies Espanolas del genero Chaenorhinum Lge., *An. Jard. Bot. Madrid*, **21**, 543-566.

435. EUPHRASIA. Smejkal, M., 1963, Taxonomické studie Ceskoslovenskych druhn rody Euphrasia L., *Biol. Práce Bratislava*, **9** (**9**), 5-82. Taxonomic studies on Czechoslavakian *Euphrasia* species.—[D.H.K.]

435. EUPHRASIA. Smejkal, M., 1964, Zum Problem der Art Enstehung und taxonomischer Bewerthung der Saisonvikaristen in der Gattung Euphrasia, *Spisy prirod. Fak. Univ. Brno*, **19 L**, 169-193.

436. ODONTITES. Schneider, U., 1964, Die Sippen der Gattung Odontites in Norddeutschland, *Fedde. Rep.*, **69**, 180-195. A revision of *Odontites* in northern Germany with a key to the identification of species and subspecies.—[D.H.K.]

441/3. PINGUICULA VULGARIS L. Webb, D. A., 1965, An unusual Pinguicula, *Irish Nat. J.*, **15**, 20-21. A note on an unusual form of *Pinguicula vulgaris* collected in Co. Meath. One of the leaves of the plant (the youngest) had its margins upcurved and fused together for the greater part of their length, so as to convert it into an inverted hollow cone resembling the pitcher-plant (*Sarracenia*) without the lid.—[D.H.K.]

445. MENTHA. Morton, J. K., 1964, The species concept in Mentha, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 113.

450. SATUREJA. Epling, C. & Játiva, C., 1964, Revision del genero Satureja en America del sur, *Brittonia*, **16**, 393-416. A revision of *Satureja* in South America, with descriptions and a key to the identification of the species.—[D.H.K.]

465. GALEOPSIS. Van der Ploeg, D. T. E., 1964, Galeopsis pubescens Bess. nog steeds bij Oranjewoud, *Gorteria*, **2**, 63-64. *Galeopsis pubescens* has become established as an adventive in the Netherlands.—[D.H.K.]

472. PLANTAGO. Sinnema, J. G. Kimstra-, 1965, Overzicht der in Nederland gevonden inheemse en adventieve Plantago-soorten, *Gorteria*, **2**, 129-135. An enumeration of the species of *Plantago* found in the Netherlands. *P. major* L., *P. coronopus* L., *P. maritima* L., *P. media* L. and *P. lanceolata* L. are native; *P. serraria* L., *P. myosurus* Lam., *P. lagopus* L., *P. loeflingii* L., *P. aristata* Michx., *P. purshii* Roem. & Schult., *P. indica* L., *P. afra* L., and *P. sempervirens* Crantz have occurred as adventives.—[D.H.K.]

474→ CAMPANULACEAE. Contandriopoulos, J., 1965, Contribution à l'étude caryologique des Campanulacées de Grèce, *Bull. Soc. Bot. France*, **111**, 222-235. Chromosome counts are given for 26 species of *Campanulaceae* collected in Greece. Most of the numbers are new. The data indicates that the genus *Campanula*, apparently heterogeneous from the caryological point of view, is constituted of four sections characterised by particular chromosome numbers: section *Medium*, $n=16$ and 17; *Trachelium*, $n=17$; *Roucella*, $n=14$, and *Rapunculus*, $n=8$ and 10.—[E.B.B.]

475. CAMPANULA. Shetler, G., 1963, A check list and key to the species of Campanula native or commonly naturalised in North America, *Rhodora*, **65**, 319-336.

503/2. GALINSOGA CILIATA (Raf.) Blake. Lascombes, S., 1964, Le Galinsoga aristulata (Bicknell) dans le Sud-Ouest, *Bull. Soc. Hist. Nat. Toulouse*, **99**, 390-392. *Galinsoga ciliata* has become established in south-west France. Recorded at Biarritz in 1955, it was observed at Toulouse in 1957. It seems not only to persist in the latter locality but is spreading.—[E.B.B.]

503/2. GALINSOGA CILIATA (Raf.) Blake. Mackechnie, R., 1964, "Shaggy Soldier" (Galinsoga ciliata) in Ayrshire, *Glasgow Nat.*, **18**, 381-382.

506. SENECIO. Brunerye, L., 1964, Aperçu comparatif sur les stations maritimes du Senecio spathulaefolius DC., *Bull. Cent. Etud. Rech. Sci. Biarritz*, **5**, 67-72. Senecios of the *spathulaefolius* group are represented by three different forms in each of the three types of coastal region of north-west France. These are described and associated species given for each region.—[E.B.B.]

506/17. SENECIO INTEGRIFOLIUS (L.) Clairv. Morgan, G. H., 1965, A colony of Senecio integrifolius at Burham, Kent, with some notes on investigations of the growth of the plants, *Bull. Kent F.C.*, **3**, 26-49. A detailed biometrical study of a colony of *Senecio integrifolius* at Burham, E. Kent.—[D.H.K.]

533. CHRYSANTHEMUM Horvatic, S., 1963, Genus Leucanthemum in Flora Jugoslaviae, *Acta Bot. Croatica*, **22**, 203-218. An account of the segregates of *Chrysanthemum leucanthemum* L. *sensu lato* in Jugoslavia.—[D.H.K.]

539. CARDUS. Kazmi, S. M. A., 1963-64, Revision der Gattung Carduus, *Mitt. Bot. Staats. München*, **5**, 139-198 and 279-550. A revision of the genus *Carduus* with full descriptions, keys, synonymy, illustrations and distribution maps.

Carduus nutans subsp. **macrolepis** (Peterm.) Kazmi, comb. nov., which has leaves almost glabrous and heads twice as large as *C. nutans* subsp. *nutans* is cited as occurring as an adventive in Britain.

C. crispus subsp. *crispus* is given as having occurred as an adventive in Britain, but the native British plant is referred to **C. crispus** subsp. **occidentalis** Chass. & Ar. *C. acanthoides* L. subsp. *acanthoides* is said to occur in England but is very rare.—[D.H.K.]

558. HIERACIUM. Sell, P. D. & West, C., 1965, Key to the Hieracia recorded from Kent (vice counties 15 and 16), *Bull. Kent F.C.*, **3**, 50-54. An artificial key to the identification of the 26 species of *Hieracium* recorded from Kent, with useful notes on the collection of suitable material.—[D.H.K.]

558/2(9). **Hieracium praealtum** Vill. ex Gochnat. Prasher, R., 1964, A hawkweed (Hieracium praealtum) new to Scotland, *Glasgow Nat.*, **18**, 382. *Hieracium praealtum* was found in a hedgerow near Hurlford, Ayrshire, and in considerable quantity about three miles further east, spreading over an old pit bing on the right-hand side of the river Irvine, in 1963. The species had hitherto not been recorded north of Buckinghamshire.—[D.H.K.]

562/1. **Luronium natans** (L.) Raf. Slack, A. A., 1964, "Floating Water Plantain" (Luronium natans) in Argyll, *Glasgow Nat.*, **18**, 382.

563/2. **Alisma lanceolatum** With. Percy, A. A., 1964, "Narrow Water-Plantain" (Alisma lanceolatum) in Lanarkshire, *Glasgow Nat.*, **18**, 383. *Alisma lanceolatum* was discovered growing in considerable quantity in the river Clyde opposite Carmyle in 1962 (det. R. Mackechnie), and in a second station some distance from the north bank in 1963. *A. lanceolatum* differs from *A. plantago-aquatica* in its lanceolate leaves, in having pink, instead of pale lilac, flowers, and in having the style inserted near the top of the fruit and not below the middle.—[D.H.K.]

571. **Lagarosiphon.** Obermeyer, A. A., 1964, The South African species of Lagarosiphon, *Bothalia*, **8**, 139-146. A revision of the South African species of *Lagarosiphon*, with descriptions, a key, and geographical distributions. *L. muscoides* Harv. and *L. major* (Ridl.) Moss are widespread, and the latter is established as an adventive in Europe and New Zealand. *L. crispus* Rendle is found in East Africa and Southern Rhodesia, while *L. verticillifolius* Oberm., sp. nov. and *L. ilicifolius* Oberm., sp. nov. are described from Natal and Bechuanaland respectively.—[D.H.K.]

592/1. **Ruscus aculeatus** L. Robert, P., 1964, Contribution à l'étude ontogénique de Ruscus aculeatus L. Développement du rhizome et formation des cladodes, *Ann. Sci. Nat.*, **5**, 739-752.

598. **Ornithogalum.** Zahariadi, C., 1964, Etudes de taxonomie expérimentale du genre Ornithogalum, *Tenth Intern. Bot. Congr. Abstr. Pap.*, 510.

599/2. **Scilla autumnalis** L. Battaglia, E., 1964, Determinazione del cariotipo dall'ovulo in Scilla autumnalis (Liliaceae), *Caryologia*, **17**, 417-425.

605/15. **Juncus acutus** L. Wright, F. R. Elliston, 1964, Juncus acutus on Braunton Burrows, *Rep. & Trans. Devon. Assoc.*, **96**, 85-86. Reports phenomenal damage to *Juncus acutus* on Braunton Burrows, N. Devon, caused by the severe weather of the 1962-63 winter. The plant which has behaved as an evergreen perennial for at least 80 years was cut down and all above-ground vegetative parts, and in some clumps, the whole plant, were killed. It is anticipated that many of the clumps will recover in due course.—[D.H.K.]

606. **Luzula.** Halkka, O., 1964, A photometric study of the Luzula problem, *Hereditas*, **52**, 81-88.

606. **Luzula.** Kožuharov, S., 1963, Notes on certain species of Genus Luzula DC. (Wood Rush) in Bulgaria, *Mitt. Bot. Inst. Sofia*, **11**, 125-139. A revision of the *Luzula sylvatica* group in Bulgaria.—[D.H.K.]

606. **Luzula.** Montserrat-Recorder, P., 1963, El Género Luzula in España , *An. Jard. Bot. Madrid*, **21**, 407-523. A revision of *Luzula* in Spain.—[D.H.K.]

607/5. Allium vineale L. Boscher, J., 1964, Étude morphologique, anatomique et biochimique des bulbilles inflorescentielles d'Allium vineale, *Tenth Intern. Bot. Congr. Abstr. Pap.*, 337.

607/10. Allium triquetrum L. McMillan, N. F., 1965, The garlic, Allium triquetrum L. in Ireland, *Irish Nat. J.*, **15**, 21. Attention is drawn to an early record (1932) for *Allium triquetrum* in Co. Down.—[D.H.K.]

611/2. Leucojum aestivum L. Mennema, J., 1965, De verspreiding van Leucojum aestivum L. in Nederland en België, *Gorteria*, **2**, 121-128. The author gives a survey of the past and present distribution of *Leucojum aestivum* in the Netherlands and Belgium. The localities are graded into three types: (1) recent localities where the species is native, (2) old stations where it is now probably extinct, and (3) localities where it has been planted or unintentionally introduced with reed-sods. Two distribution maps accompany the account.—[D.H.K.]

611/2. Leucojum aestivum L. Synnott, D. M., 1965, The summer snowflake new to Co. Meath, *Irish Nat. J.*, **15**, 81.

615/1. Sisyrinchium bermudiana L. Ingram, R., 1964, Sisyrinchium in Ireland, *Tenth Intern. Bot. Congr. Abstr. Pap.*, 390. A careful study of the taxonomy and cytology of *S. bermudiana* from both Irish and American material was carried out. In Ireland the species is fairly uniform, both cytologically ($2n=88$) and morphologically. In America the species is very variable with chromosome numbers ranging from $2n=80$ to $2n=96$. The Irish populations fall well within this range of variation, which might suggest that the plant is an introduction though ecological evidence does not support this view.

In Europe the Irish plant has been confused with *S. montanum* var. *crebrum*, which is widely naturalised on the Continent but the two species are morphologically distinct and the hybrid between them is completely sterile.—[Author's summary.]

627/3. Spiranthes romanzoffiana Cham. Webb. D. A., 1965, Spiranthes romanzoffiana on Lough Corrib, *Irish Nat. J.*, **15**, 21. A new Irish station is reported for *Spiranthes romanzoffiana*.—[D.H.K.]

634/1. Herminium monorchis (L.) R. Br. Bultez, P. & Dupontreue, G., 1965, Les Orchidées rares en Picardie: Herminium monorchis (L.) R. Br., *Rev. Fed. Franc. Soc. Sci. Nat.*, **4**, 1-2.

641/1. Himantoglossum hircinum (L.) Spreng. Rutterford, M. G., 1965, The coming of the Lizard Orchid to the Breck, *Trans. Suffolk Nat. Soc.*, **13**, 24-25.

642/2. Orchis militaris L. Billy, & d'Alleizette, 1964, Orchis militaris et ses hybrides en Basse Auvergne, *Bull. Soc. Bot. France*, **111**, 101-102. A note on the discovery, in Auvergne, of a new locality for *Orchis militaris* and hybrids with other species. Notes on the hybrids are provided.—[E.B.B.]

646/1. Acorus calamus L. Jervis, R. A. & Buell, M. F., 1964, Acorus calamus in New Jersey, *Bull. Torr. Bot. Club*, **91**, 334. *Acorus calamus* is introduced in North America, and although it does not appear to produce mature seed in Europe it does so in the north-central United States. Mature seed was collected from colonies in New Jersey in August 1961, stored dry and planted in March 1962 in a mixture of sand and peat; this seed failed to germinate. Further mature seed was gathered from the same colonies in August 1962, stored submerged in water at a temperature of 4°C. and planted on 15 February 1963 in the same way as previously. This germinated, the first seedlings appearing on 6 March 1963.

Non-seed producing clones of *A. calamus* occur in the eastern seaboard of the United States.—[D.H.K.]

650/2. LEMNA TRISULCA L. Den Hartog, C., 1964, Over de oecologie van bloeiende Lemna trisulca, *Gorteria*, **2**, 68-72. Flowering *Lemna trisulca* has been found in three localities in the province of Zeeland (Netherlands). The vegetative plants are completely submerged and do not show any adaption to aerial life (ricciellids). The fertile plants rise to and drift on the surface, as their fronds contain intracellular air spaces and stomata are developed (lemnids). The inflorescences are protandrous. Pollination takes place by direct contact of the stiff curved stamens of the one plant with the short style of another plant. Contacts are easily made as wind, water currents and moving animals continually shift the position of the fronds, which usually are densely packed.

The species has its optimum in relatively small waters, where it is sheltered from wind- and wave-action, and where it can develop mass vegetations colonizing the free space of the water without competition from floating plants or floating leaves of rooting plants. The species forms a monospecific plant association, *Lemnetum trisulcae*, which has to be classified together with the *Riccietum fluitantis* into the *Lemnion trisulcae*, the alliance of the ricciellid water-plant communities.—[Author's summary.]

664→ GRAMINEAE. Mowszowicz, J., 1964, Wegatatwyna proliferacja klosków u niektórych traw, *Acta Soc. Bot. Pol.*, **33**, 593-600. The vegetative proliferation of spikelets in *Phleum pratense, Dactylis glomerata* and *Lolium perenne* in the Polish province of Lódz is described and illustrated by photographs.—[E.B.B.]

670. FESTUCA. Auquier, P., 1964, Les Festuca des terrain calaminaires de la Wallonie septentrionale, *Bull. Soc. Roy. Bot. Belg.*, **97**, 99-129. *Festuca ovina* and *F. valesiaca* growing in ground rich in zinc are studied. It is concluded that several taxa, particularly varieties and sub-varieties of *F. ovina*, are involved; none of these are specific to the type of ground and epithets such as var. "*calaminaria*" are unjustifiable; they have affinities with mountain forms; they seem in Belgium to be absent from adjoining non-mineralised biotopes, and are given the term local metallophytes, but they may be found in more or less distant non-mineralised localities.—[E.B.B.]

670/8. FESTUCA OVINA L. Bidault, M., 1965, Relations entre la polyploidie les longueurs des cellules épidermiques et le diamètre des grains de pollen chez quelques types de Festuca ovina L., s.l., *Bull. Soc. Bot. France*, **111**, 111-119. Study of populations of varieties of *Festuca ovina* show a clear relationship between the degree of polyploidy, the length of epidermal cells and the diameter of pollen grains. Analysis of these characters may help in the definition of differences between closely allied taxa.—[E.B.B.]

670/8. FESTUCA OVINA L. Huon, M., 1965, Remarques sur les Festuca ovina L. des pelouses xerophiles calcaires des bordures du Massif Armoricain, *Bull. Soc. Bot. France*, **111**, 165-172. The eastern border of the

Breton massif presents two types of calcareous grassland according to the nature of the characteristic *Festuca*. Seven new taxa of the genus *Festuca* for the Breton flora are added as a result of this study.—[E.B.B.]

670/2 × 671/2. FESTUCA ARUNDINACEA Schreb. × LOLIUM MULTIFLORUM Lam. Beddows, A. R., 1965, Lolium multiflorum Lam. × Festuca arundinacea Schreb.: natural and artificial hybrids, *J. Linn. Soc., Bot.*, **59**, 89-98.

671. LOLIUM. Cooper, J. P., 1964, Climatic variation in forage grasses, 1. Leaf development in climatic races of Lolium and Dactylis, *J. Appl. Ecol.*, **1**, 45-61.

671/1. LOLIUM PERENNE L. Breese, E. L., 1964, The genetical structure of populations of Lolium perenne, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 228-229.

671/2. LOLIUM MULTIFLORUM.—See 670/2. FESTUCA ARUNDINACEA.

676. POA. Chrtek, J. & Václav, J., 1964, Poznámky k taxonomi některých druhu rodu Poa L. v Tatrách, *Biologia*, **19**, 493-497. Taxonomic studies on the *Poa* species found in the Tatra Mountains.—[D.H.K.]

678. DACTYLIS.—See 671. LOLIUM.

678/1. DACTYLIS GLOMERATA L. Calder, D. M., 1964, Flowering behaviour of populations of Dactylis glomerata under field conditions in Britain, *J. Appl. Ecol.*, **1**, 307-320.

683. BROMUS. Vivant, J., 1964, Au sujet de Bromus commutatus Schrader, *Bull. Soc. Bot. France*, **111**, 97-100. *Bromus commutatus*, accepted by many authors of French floras as a distinct species, appears to be only a local form of *B. racemosus* L. The following table is provided:

	B. RACEMOSUS L.	B. COMMUTATUS Schrad.
QUANTITATIVE SPECIFIC CHARACTERS	Plant short; panicle almost simple.	plant taller; panicle with lower branches 2 to 5 together, the longest with 2-3 spikelets.
	spikelets with 7-9 flowers	spikelets with 9-11 flowers.
QUALITATIVE SPECIFIC CHARACTERS	panicle upright; lower glume with scarcely arched border not forming an obtuse angle above the middle.	panicle ultimately drooping to one side; borders of the glume forming an obtuse angle above the middle.

[E.B.B.]

689. KOELERIA. Ujhelyi, J., 1962-63, Data to the systematics of the Subsectio Bulbosae of the genus Koeleria, 2, *Ann. Hist. Nat. Mus. Nat. Hung.*, **54**, 199-220 and **55**, 187-205.

692/1. AVENA FATUA L. Curran, P. L., 1965, Avena fatua L. in North County Dublin, *Irish Nat. J.*, **15**, 55-56. *Avena fatua*, hitherto little more than casual in Ireland has now become well established in a limited area of County Dublin.—[D.H.K.]

696/3. DESCHAMPSIA FLEXUOSA (L.) Trin. Jarvis, P. G., 1964, Interference by Deschampsia flexuosa (L.) Trin., *Oikos*, **15**, 56-78.

699/1×700/1. ×AMMOCALAMAGROSTIS BALTICA (Schrad.) P. Fourn. Kubien, E., 1964, Badania cytologiczne, morfologiczne i anatomiczne nad Ammophila baltica (Flügge) Link i jej domnienanymi gatunkami rodziciet skimi, *Acta Soc. Bot. Pol.*, **33**, 527-546. Cytological and anatomical studies on populations of ×*Ammocalamagrostis baltica* on the Baltic coast of Poland.—[D.H.K.]

700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. Stirling, A. McG., 1964, "Bushgrass" (Calamagrostis epigejos) in Argyll, *Glasgow Nat.*, **18**, 383-384.

716. SPARTINA. Marchant, C. J., 1964, Recent significant discoveries in the grass genus Spartina, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 422.

716/2×1. SPARTINA×TOWNSENDII H. & J. Groves. Benoit, P. M., 1964, The threat of Spartina: a plea for action, *Nature in Wales*, **9**, 47-48. *Spartina×townsendii* is frequently planted in salt-marshes, mud-banks, etc., on British coasts to reclaim land. The author points out that not only is the economic value of the plant doubtful, but by its rapid spread it destroys the natural succession from bare mud through salt-marsh communities to mature grassland, thus destroying suitable habitats for native salt-marsh plants and the feeding grounds of waders and other estuary birds. A plea is made for the eradication of new colonies of *Spartina* by selective herbicides.—[D.H.K.]

717/1. CYNODON DACTYLON (L.) Pers. Gajc, D., 1962, Ekoloska studija zubaće (Cynodon dactylon), *Zborn. Radova biol. Inst. NR. Srbije*, **6** (**8**), 1-39. An ecological account of *Cynodon dactylon* —[D.H.K.]

TOPOGRAPHICAL

3-4, DEVON. Wilkinson, V. M., 1964, Fifty-sixth report on botany, *Rep. & Trans. Devon. Assoc.*, **96**, 81-85. Contains a few new vice-county records. —[D.H.K.]

4, N. DEVON. Wright, F. R. Elliston, 1964, Juncus acutus on Braunton Burrows, *Rep. & Trans. Devon. Assoc.*, **96**, 85-86.

5-6, SOM. Hallam, A. D., 1964, Recorder's Notes: Botanical, *Proc. Som. Arch. & N.H.S.*, **108**, 179-180.

6, N. SOM. & 41, GLAM. Gillham, M. E., 1964, The vegetation of local coastal gull colonies, *Trans. Cardiff Nat. Soc.*, **91**, 23-33. Different gull species prefer different vegetation types for their nesting but are fairly adaptable, spilling into each others' habitats as population pressure becomes acute, and even adopting the arboreal habitat. Whatever type of vegetation they chose becomes modified as a cliff vegetation is fairly tolerant of gull disturbance; the long grass communities of Flatholm are showing considerable effects after less than ten years of occupation; the more sheltered flora of Steepholm exhibits the greatest changes, partly because of taller growths of less halophytic plants are more vulnerable, partly because the gulls are more numerous and have been there longer. All the sites investigated are on calcareous rock and so valid comparisons can be made regarding the variable climatic and biotic factors.—[Author's summary.] The areas investigated were Steepholm Island and Flatholm Island in the Bristol Channel, Worms Head, Gower, Glamorgan, and the liassic limestone cliffs of the Vale of Glamorgan.—[D.H.K.]

7-8, WILTS. Grose, D., 1964, Wiltshire Plant Notes (24), *Wilts. Arch. & N.H. Mag.*, **59**, 228-231. Gives details of the more interesting Wiltshire records made in 1963.—[D.H.K.]

9, DORSET. Good, R. d'O., 1964, Botany, *Proc. Dorset N.H. & Arch. Soc.*, **85**, 39-40.

10, ISLE OF WIGHT. White, T., 1964, Botanical notes for 1962, *Proc. Isle of Wight N.H. & Arch. Soc.*, **5**, 318-320. Contains a few new vice-county records.—[D.H.K.]

15, E. KENT. McClintock, D., 1965, Vascular plants found on the top level of Rochester Castle, 112 feet above the ground, *Bull. Kent F.C.*, **10**, 35. Lists 23 vascular plants found growing on the top level of Rochester Castle in August 1964. Unusual species occurring in such a habitat include *Lepidium ruderale, Chenopodium rubrum, Polygonum arenastrum, Ballota nigra, Matricaria matricarioides, Catapodium rigidum, Puccinellia fasciculata* and *Agrostis stolonifera*.—[D.H.K.]

15, E. KENT. Morgan, G. H., 1965, A colony of Senecio integrifolius at Burham, Kent, with some notes on investigations of the growth of the plants, *Bull. Kent F.C.*, **3**, 26-49.

15, E. KENT. Scott, G. A. M., 1965, The shingle succession at Dungeness, *J. Ecol.*, **53**, 21-31.

15-16, KENT. Sell, P. D. & West, C., 1965, Key to the Hieracia recorded from Kent (vice counties 15 and 16), *Bull. Kent F.C.*, **3**, 50-54.

16, W. KENT. Spooner, A. G. & Stoyel, B. D., 1965, Botanical survey of Ruxley gravel pit, *Bull. Kent F.C.*, **3**, 54-59. An account of the flora of Ruxley gravel pit, in the Cray valley, about a mile south-east of Sidcup, with an annotated list of the species noted there.—[D.H.K.]

16, W. KENT, 17, SURREY, 18-19, ESSEX, 20, HERTS., 21 MIDDX. & 24, BUCKS. Lousley, J. E., 1965, Botanical records for 1964, *Lond. Nat.*, **44**, 12-17.

17, SURREY. Cundall, R. J. (Editor), 1965, *A Study of the Flora of the Hog's Back*. The Farnham Museum Society, Natural History. Pp. 12. Farnham. A systematic list of vascular plants recorded during 1964 on the Hog's Back by members of the Natural History Group of the Farnham Museum Society.—[D.H.K.]

17, SURREY & 21, MIDDX. Kent, D. H., 1965, Further additions and corrections to the flora of Central London, *Lond. Nat.*, **44**, 18-28.

21, MIDDX. McClintock, D., 1964, Natural History of the Garden of Buckingham Palace: wild and naturalized plants, *Proc. & Trans. S. Lond. Entom. & N.H.S.*, **1963** (**2**), 14-25. An account of a survey of the wild and naturalised flora of the grounds of Buckingham Palace. Over 260 different species of flowering plants and vascular cryptogams are recorded from the 39 acres which make up the Palace grounds.—[D.H.K.]

21, MIDDX. Moxey, P., 1964, The Ruislip Local Nature Reserve: The plant communities, *J. Ruislip & Dist. N.H.S.*, **13**, 14-17.

21, MIDDX. Moxey, P., 1964, Systematic list of the plants of Ruislip Local Nature Reserve, *J. Ruislip & Dist. N.H.S.*, **13**, 18-20.

22, BERKS., 23, OXON & 24, BUCKS. Ambrose, F., 1964, Botanical records, *Middle-Thames Nat.*, **15**, 28-29 & **16**, 24-26.

22, BERKS., 23, OXON. & 24, BUCKS. Hyde, M. B., 1962, Botanical records, *Middle-Thames Nat.*, **14**, 31-33.

25, E. SUFFOLK. Simpson, F. W., 1965, Flora of the Coralline and Red Crags of East Suffolk, *Trans. Suffolk Nat. Soc.*, **13**, 7-10.

25-26, SUFFOLK. Rutterford, M. G., 1965, The coming of the Lizard Orchid to the Breck, *Trans. Suffolk Nat. Soc.*, **13**, 24-25. In 1954 the writer discovered a single plant of *Himantoglossum hircinum* in an undisclosed heathland locality in Suffolk. It failed to flower in 1954, but did so in 1955, 1956 and 1957. In 1957 a seedling plant was noted, and in 1958 this had increased to eight, and in 1959 to fifteen. The parent plant did not flower between 1958 and 1960, but bloomed again in 1961, when seventeen seedling plants were noted. No flowers were produced in 1962 and 1963 but the original plant flowered again in 1964.—[D.H.K.]

27, E. SUFFOLK. Buttery, B. R. & Lambert, J. M., 1965, Competition between Glyceria maxima and Phragmites communis in the region of Surlingham Broad, 1. The competition mechanism, *J. Ecol.*, **53**, 163-181.

27, E. SUFFOLK. Buttery, B. R., Williams, W. T. & Lambert, J. M., 1965, Competition between Glyceria maxima and Phragmites communis in the region of Surlingham Broad, 2. The fen gradient, *J. Ecol.*, **53**, 183-195.

31, HUNTINGDON. Gilbert, J. L., 1965, Flora of Huntingdonshire: Wild Flowers, *Peterborough Museum Society Occasional Papers* No. **4**, 1-63. A systematic list of the vascular plants recorded from Huntingdonshire. —[D.H.K.]

32, NORTHANTS. Beall, S., 1964, The flora and fauna of the grounds of Margaret Spencer Hospital, Dallington, *J. Northants. N.H.S. & F.C.*, **34**, 307-308.

32, NORTHANTS. Gent, Mrs. P., 1964, Botanical records, 1963, *J. Northants. N.H.S. & F.C.*, **34**, 310-311.

32, NORTHANTS. Laundon, J. R., 1964, Semi-natural vegetation in Northamptonshire, *J. Northants. N.H.S. & F.C.*, **34**, 268-281. The author surveys the semi-natural vegetation of the county and points out that unless adequate steps are taken to preserve the remaining areas they will soon be destroyed by the activities of man.—[D.H.K.]

32, NORTHANTS. Payne, F. D., 1964, Botanical notes, 1963, *J. Northants. N.H.S. & F.C.*, **34**, 311-313.

*38, WARWICK. Readett, R. C., Hawkes, J. G., Cadbury, D. A. & Laflin, T., 1965, Check lists of the vascular plants and bryophytes of Warwickshire (v.c. 38) and surrounding vice-counties, *Proc. Birmingham N.H.S.*, **20** (**4**), 1-64.

41, GLAM. Wade, A. E., 1964, Glamorgan Botanical Notes, 1961-63, *Trans. Cardiff Nat. Soc.*, **91**, 38.

41, GLAM., 42, BRECON, 43, RADNOR, 44, CARM., 45, PEMB., 46, CARD., 47, MONTG., 48, MER., 49, CAERN., 50, DENBIGH & 52, ANGLESEY. Benoit, P. M., 1964, Field Notes: Plants, *Nature in Wales*, **9**, 69-75.

48, MER. Teague, E., 1964, Notes on the flora of Aberdovey, 1962-63, *Nature in Wales*, **9**, 61-65.

48, MER. Benoit, P. M., 1964, The extent of Salicornia perennis in Merioneth in 1964, *Nature in Wales*, **9**, 79-81.

57, DERBY. Anderson, D. J., 1965, Studies on structure in plant communities, 1. An analysis of limestone grassland in Monk's Dale, Derbyshire, *J. Ecol.*, **53**, 9-107.

58, CHESTER. London, M., 1964, The flora of Westwood Road, Bidston, *Proc. Liverpool Nat. F.C.*, **1961-63**, 25-26.

61-65, YORK. Houseman, F., 1965, Plant records: aliens and casuals, *The Nat.*, **1965**, 26-27.

*See review on p. 197.—ED.

61-65, YORK. Rob, C. M., 1965, Plant records, *The Nat.*, **1965**, 24-26.

63, S.-W. YORK. Murgatroyd, F., 1965, Cragg Vale and its vegetation, *Athene*, **1965**, 156-160.

66, DURHAM, 67-68, NORTHUMBERLAND & 80, ROXBURGH. Harrison, J. W. Heslop-, 1964, Records: flowering plants and ferns, *Vasc.*, **49**, 24 & 32.

75, AYR. Mackechnie, R., 1964, "Shaggy Soldier" (Galinsoga ciliata) in Ayrshire, *Glasgow Nat.*, **18**, 381-382. *Galinsoga ciliata* is reported from the Municipal Garden at Beith: other recent records from the Clyde area are also mentioned.—[D.H.K.]

75, AYR. Prasher, R., 1964, Shepherd's Cress (Teesdalia nudicaulis) in an unusual habitat, *Glasgow Nat.*, **18**, 380.

75, AYR. Prasher, R., 1964, A Hawkeed (Hieracium praealtum) new to Scotland, *Glasgow Nat.*, **18**, 382.

76, RENFREW. Mackechnie, R., 1964, Woody nightshade (Solanum dulcamara) with white flowers, *Glasgow Nat.*, **18**, 381. White-flowered plants of *Solanum dulcamara* are reported from near the eastern entrance to the Pollock Estate.—[D.H.K.]

76, RENFREW. Mackechnie. R., 1964, New localities for Renfrewshire plants, *Glasgow Nat.*, **18**, 384-385. New localities are given for a number of local Renfrewshire plants.—[D.H.K.]

76, RENFREW. Ribbons, B. W., 1964, Salad Burnet (Poterium sanguisorba) in Renfrewshire, *Glasgow Nat.*, **18**, 381.

77, LANARK. Mackechnie, R., 1964, Sedges at Possil Marsh, *Glasgow Nat.*, **18**, 383. *Carex hirta* and *C. diandra* are recorded from Possil Marsh. —[D.H.K.]

77, LANARK. Percy, A. A., 1964, "Narrow Water Plantain" (Alisma lanceolatum) in Lanarkshire, *Glasgow Nat.*, **18**, 383.

91, KINCARDINE. Ribbons, B. W. 1964, Scot's Lovage (Ligusticum scoticum) at St. Cyrus, Kincardine, *Glasgow Nat.*, **18**, 381.

97, WESTERNESS & 98, ARGYLL. Stirling, A. McG., 1964, "Bushgrass" (Calamagrostis epigeios) in Argyll, *Glasgow Nat.*, **18**, 383-384. *Calamagrostis epigejos*, a very local grass in Scotland, has recently been found in four localities at Knapdale and one in the Craignash area.—[D.H.K.]

98, ARGYLL. Slack, A. A., 1964, "Floating Water-Plantain" (Luronium natans) in Argyll, *Glasgow Nat.*, **18**, 382.

98, ARGYLL. Stirling, A. McG., 1964, Flora of Serpentine outcrop in Glendaruel, Argyll, *Glasgow Nat.*, **18**, 384. Serpentine rock outcrops extensively between 1,000 and 1,200 feet altitude on the high ground to the south-west of Kilbridemore, Glendaruel. A visit to the area in July 1963 produced *Asplenium viride, Thalictrum alpinum, Cardaminopsis petraea, Silene maritima, Anthyllis vulneraria, Dryas octopetala, Saxifraga aizoides, Plantago maritima, Eriophorum latifolium* and *Helictotrichon pubescens.* —[D.H.K.]

H.9, CLARE. Parish, M., 1964, The Burren, *Country-side*, **20**, 2-6. A popular account of the flora of the Burren.—[D.H.K.]

H.21, DUBLIN. Curran, P. L., 1965, Avena fatua L. in North County Dublin, *Irish Nat. J.*, **15**, 55-56.

ECOLOGICAL (See also TOPOGRAPHICAL)

Davison, A. W., Grime, J. P. & Hutchinson, T. P., 1964, Some of the factors affecting seedling establishment in grassland, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 355.

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Tsuriell, E. D., 1964, The influence of micro-climatical factors on sand-dune vegetation, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 240-241.

Willis, A. J., 1964, The influence of mineral nutrients on the vegetation of sand-dune communities, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 265.

HISTORICAL

Allen, D. E., 1965, Edward Forbes, Manx botanist, *J. Manx Mus.*, **6**, 254-256. Edward Forbes (1815-54) was the first resident worker of any note on the Manx flora, and for this reason his numerous first records need to be more precisely dated than has hitherto seemed possible. Study of his biography together with a few dated, though unlocalised, specimens of his in national herbaria has shown that his main work, summarised in a bare list of 348 species contributed to Watson's *New Botanists' Guide*, was carried out in 1831, 1832 and 1834. A further 25 species and many fresh localities were evidently added on later holiday visits to the island in 1836-40. He appears to have left no true herbarium, the scrappy "Hortus Siccus Monensis", now in the British Museum and hitherto dated to 1834-36, being merely a childhood collection and wholly unlocalised.—[D.E.A.]

Lloyd, B., 1964, The herbarium of the Royal College of Science and Technology, Glasgow, *Glasgow Nat.*, **18**, 363-368. An account is given of the herbarium of the Royal College of Science and Technology, Glasgow (now the University of Strathclyde). The collection consists of c. 9,500 specimens and contains the herbaria of John Scouler (1804-71) and Roger Hennedy (1801-76).—[D.H.K.]

PALAEOBOTANY

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NOMENCLATURE

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Kirpicznikov, M. C., 1965, Proposals for the compiling of a list of abbreviations of authors' names, *Taxon*, **14**, 11-12.

Kirpicznikov, M. C., 1965, Table of the endings recommended for rejection in cases of abbreviation of authors' names, *Taxon*, **14**, 65-68.

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MISCELLANEOUS

Aymonin, G., 1965, La connaissance des unités systématiques de l'Europe: documents et perspectives, *Bull. Soc. Bot. France*, **111**, 141-149. The author gives a critical summary of the special 'Flora Europaea' volume in *Webbia*. Pointing out the very great importance of bibliographical indications especially for eastern European countries, the article comprises also a review of results, problems and difficulties concerning the works in some regions, for example all the Mediterranean territories. Accordingly, the interest of botanical investigation in the south European flora is mentioned to elucidate doubtful questions of chorology and taxonomy for the whole European flora.—[Author's summary.]

Baker, H. G., 1964, Hybridization in the evolution of weeds, *Tenth Internat. Bot. Congr. Abstr. Pap.*, 134.

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LOCAL OFFICERS' CONFERENCE, 1964

Compiled by Mr. D. E. Allen

The idea of a special week-end conference to which all the Society's local officers would be invited for a mutual exchange of views and suggestions was first put to the Development and Rules Committee by its Honorary Secretary, A. C. Jermy, in March 1963. The completion of the main part of the Distribution Maps Scheme seemed likely to leave a hiatus in local activity and made the moment an appropriate one for a thorough re-examination of the aims and functions of the Society's long established system of District Secretaries and Recorders. A continual weakness of this system, it was felt, was the lack of contact between the many local officers which prevented common aims and a sense of identity emerging; while the Committee itself had long felt handicapped in its attempts to build up the Local Organisation by the tenuousness of its contacts with those on whom the task of transforming its paper schemes into local realities inevitably depended. Mr. Jermy accordingly envisaged a kind of summer school for local officers which might, if found useful, become a regular event. The Committee had considerable misgivings about the likely support for such a venture and proposed that the relevant members should first be circularised and asked for their opinion.

In the event the response was highly encouraging and plans were put in hand for the conference, which was duly held in the Laboratory of the Botanic Garden, Cambridge, by kind permsision of the Director, on Saturday and Sunday, September 26 and 27, 1964. Twenty-five local officers, very representative of the country geographically, were able to accept the invitation to attend and a further fifteen other members of the Society, mainly officers and committee members, were present on one or both days.

The programme of nine talks was grouped for convenience into three distinct sessions, each covering a separate aspect of potential local activity.

SATURDAY

Session 1. Structure. *Chairman*: Dr. F. H. Perring

D. E. Allen opened the Conference with an introductory talk tracing the history and development of the present Local Organisation since its origin in 1932 when W. H. Pearsall succeeded Dr. Druce as Honorary Secretary of the Society. He drew attention to the major reform worked out in 1956-60 which had resulted in the creation of a three-tier structure consisting of:—

7 (now 8) Regions, electing *Regional Representatives* to Council.

15 (now 13) Districts, looked after by *District Secretaries* (replacing the former Local Secretaries).

155 vice-counties or portions of vice-counties, looked after by *Recorders* (absorbing the former office of Referee).

One hundred and forty-four positions were currently filled by members acting as Recorders, so that a considerable proportion of the Society was involved in the Local Organisation, quite apart from the fact that the adoption of the Regional Representative system had in effect placed the Council and thus the management of the Society on a substantially regional basis.

He stressed that the Development and Rules Committee, of which he was the Acting Secretary, had long felt that it was acting in the dark in trying to promote regional and local activities that would help to vitalise the Local Organisation as it existed on paper. In the past there had been very little feed-back of ideas and one of the primary purposes of the present conference was to go some of the way towards remedying this. The recent emergence of active regional committees in Scotland, Wales and Ireland had been welcomed unreservedly, as it was recognised that local activity stood the best chance of being aroused by a national or regional sense of identity. These committees were already functioning as autonomous segments of the Local Organisation and were in a position to initiate and co-ordinate local activities far more effectively than would ever be possible from a single centralised source. It was hoped that some at least of the English regions would soon be encouraged to follow their example. If this were to come about, the Local Organisation would be transformed and the Society would achieve the essentially federal structure that it had recognised for some years as desirable as one of its ultimate aims.

The Distribution Maps Scheme had demonstrated to the Society's members the feasibility and scientific value of nationwide co-operative ventures, and he himself would like to see field botanists following the impressive lead of British ornithologists in carrying out a continuing programme of centrally-directed "network research". The Local Organisation was the obvious vehicle for this. Possible suitable subjects included the comparative floristics of certain ecological formations, such as the flora of British dunes, and the study of various infraspecific variants with, perhaps, the mapping of polymorph-ratio clines as a primary objective. "Enquiries" of this type would need to be concentrated on things that were both clear-cut and reasonably simple while at the same time promising to yield far more fruitful results than if undertaken by individuals working in isolation. It would also be important to guard against trying to initiate too much, lest enthusiasm wilt by too much diffusion of effort.

Dr. J. P. SAVIDGE followed with a detailed account of the activities and plans of one of the recently-established regional committees—that in Wales. Of about eighty B.S.B.I. members in Wales (a total roughly doubled since the Welsh Committee came into being) only about twenty were at present reasonably active. Twelve of these composed the Committee, the three different parts of Wales each being represented by four members. The Committee meets in the centre of its area, at Aberystwyth.

It viewed itself as having four tasks: to bring together all botanists in Wales; to increase the membership of the B.S.B.I. in Wales; to undertake a number of surveys on various aspects of the Welsh flora; and to promote the cause of conservation in Wales. To these ends it had begun by instituting an annual programme of indoor and outdoor meetings, each of which had so far been attended by 75-90% of the Committee. The office of District Secretary had been dispensed with; instead Recorders were to be made more use of, in particular in arranging meetings and in attracting new members. Each Recorder was to be supplied with a card-index in which to keep a note of records for his area; these would be the property of the Committee, which would ensure that the records were passed on whenever a Recordership changed hands.

At the outset it had been felt that there was no suitable publication that could be given to prospective members. The Society's Prospectus was insufficient, while *Watsonia* and *Proceedings* seemed liable to put people off. The Committee had therefore instituted its own Bulletin, which it was intended to issue three times a year. Partly printed and partly duplicated, it was sent free to members resident in Wales and was available to B.S.B.I. members outside Wales for a nominal sum. The primary purpose was to keep Welsh amateurs in touch and accordingly it aimed at an informal, friendly approach in its style and contents.

The region was co-operating in the National Museum of Wales's survey of Welsh lakes, which it was hoped would form part of a wider survey of various types of habitat in Wales with a view to publishing a semi-popular book in due course. This would include a discussion of the factors controlling distribution and summarise the findings of these surveys. In connection with this a survey was planned of the details of frequency and cover of species, and of the ecological factors involved, in a sample of one-kilometre grid squares.

J. E. Lousley concluded the morning session with a paper on "The Botanical Network", dealing with the problems of liaison with different bodies. Speaking in the light of his experience as an officer of two national bodies, of the largest local natural history society and of a county naturalists' trust, he said that in practice he had never found any conflict between the *objects* of these various organisations, although there was of course a very considerable overlap of interests. In so far as disputes sometimes arise, these are normally due to petty jealousies between individuals or when organisations are in competition for time and money. The sensible view is that it does not matter who does a particular piece of work as long as it is done to the best advantage. Common aims should be furthered by the body most competent to carry them out, and it could well be that on occasions the objects of the B.S.B.I. were best furthered by a local officer working through some other body.

The two types of body with which local officers were most likely to need to liaise were county trusts and local natural history societies. Most county trusts were at present severely handicapped by lack of botanical information about the areas they are striving to preserve and local botanists could help them a great deal. Conservation matters considered of national importance, however, should be reported as well to the B.S.B.I. Conservation Committee, which was sometimes in a better position than county trusts to deal with these at the national level. Assistance to local natural history societies was also a very important function of the Society's local officers, not least because those with a strong botanical neuleus provided a steady flow of new members for the B.S.B.I., which in turn increased the flow of new records and helped to bring threats to the Society's notice more quickly.

DISCUSSION

Dr. J. G. **DONY** said he found it a constant problem trying to decide which threats were of local and which of national importance.

There was general agreement that responsibility for conservation matters might be better transferred from District Secretaries to Recorders in view of the more convenient size of area covered by the latter.

J. **KIERNAN**, speaking as one of the four District Secretaries present, remarked that the members in a District are generally not aware who their District Secretary is. If it was felt that the only way to correct this was to inform them individually, who should be responsible for doing this, the District Secretary or the Development and Rules Committee? District Secretaries in their turn needed to be kept informed of changes of address and of new members in their District. Much of their effectiveness depended on their being prepared to send out considerable numbers of circulars; this could be costly and time-consuming, and he felt they would welcome help in this direction. Was there any chance of their being able to draw on addressograph facilities, for instance?

Dr. **PERRING** wondered if grants to cover the cost of sending our circulars could not be made to each District, perhaps in proportion to the number of new members each recruited so that payments matched activity. He added that he was currently investigating the possibility of putting the names and locations of all B.S.B.I. members on to punched cards. If this proved practicable, the membership list could be sorted very speedily by vice-counties or any larger grouping and the resulting batches of names passed straight on to local officers.

It was agreed that notices of local activities ought to go out from a local address. Circularising these to the whole Society would be inappropriate; the quantity, moreover, was likely to prove overwhelming and the expense insupportable at £25-30 for each *ad hoc* mailing. On the other hand, circularising only those members living in each District or Region concerned meant that non-residents who for some reason might be specially interested in a particular area and keen to attend some of its functions would be liable not to hear of them.

J. C. **GARDINER** suggested that a possible solution to this last problem was to make more use of the Society's *Proceedings* to publicise local and regional activities. Alternatively, or in addition, a notice could be published regularly informing members that they could apply to be placed on regional mailing lists. A similar notice might also be inserted in the Calendar, together with the names and addresses of the appropriate local officers to whom members should write for this purpose.

On the subject of recruiting new members, E. A. **ELLIS** said he had found commercial travellers a surprisingly neglected but rewarding source. Dr. **PERRING** also mentioned the National Agricultural Advisory Service.

SESSION 2. ADMINISTRATION. *Chairman*: J. C. GARDINER.

The first talk after lunch was by Dr. PERRING on "The Functions of a Recorder". He began by stressing that the task of a Recorder must vary enormously depending on how much work both has been and is being done in the area concerned. For little-known areas the problems could be very great.

He supported the Welsh Committee's idea of vesting an official card-index of the local flora in an appropriate local organisation, so that it would be available to the public at large. In this connection he drew attention to the convenience of registers as a method of record-keeping, such as those made on a parish-by-parish basis, of which Trail's *Flora of Buchan* was a good example. In compiling the *Flora of Cambridgeshire* they had devised a register on the basis of presence or absence in each ten-kilometre grid-square, with a special system of notation to indicate extinctions, backing of the record by a herbarium specimen, the existence of a Maps Scheme individual record card, etc.

In collecting records care should be taken to search all local herbaria and as many of the national herbaria as possible. The latter was often a daunting task and he felt the Society could well assist by trying to recruit a panel of members willing to go through the larger herbaria not at present sorted by counties or vice-counties and take down the details from the sheets. He wondered if any system had been adopted for depositing the voucher specimens supporting records published by the Society in a central place, on the lines of H. C. Watson's herbarium at Kew.

Turning to the problems of searching the published literature, he emphasised the great value of N. D. Simpson's *Bibliographical Index of the British Flora* for this purpose and mentioned that a comprehensive list of potentially useful works would be appearing as an appendix to the "Guide for Local Flora Writers" (1964, *Proc. B.S.B.I.*, **5**, 283-302). He suggested that the Society keep a library of these key works together with interleaved copies of published county floras, which could go out on long loan to Recorders. His own personal dream was a Biological Information Centre which would be engaged in compiling all the records ever published. For the purpose of the Maps Scheme he had already extracted all those in the Botanical Exchange Club reports back to 1932.

In collecting additions for the Maps Scheme, Recorders were recommended to consolidate these in batches of at least fifty before sending them in periodically. These would always be welcome in view of the prospect of a new edition of the *Atlas* in about 1980.

Dr. Perring closed by mentioning that the Conservation Committee was compiling an index of national rarities (defined as species with only about five existing localities in the British Isles) considered potentially in need of protection. This was just the kind of special task with which Recorders should be asked to assist.

DISCUSSION

E. B. BANGERTER reported that the full collection of records published by the Society in recent years was kept at the Natural History Museum but was inadequately sorted at present.

J. E. **Lousley** felt it was not practical to insist on a single central repository for voucher specimens; local institutions were often more appropriate for this purpose.

To rectify the present position whereby Recorders have next to no say in the Plant Records that are published, while at the same time usefully passing through to their files the data that appear, he suggested that standard forms on NCR (no carbon required) paper should be printed and issued on which all Plant Records could in future be entered, with space for noting the location of any supporting specimens. The copies so produced could be sent as a matter of routine to Recorders, who would then have a chance of noting the record and recommending whether it was worth publishing in the light of their local knowledge. Since there would always be two copies of every record, published or unpublished, they could be sorted both systematically and geographically.

J. C. **Gardiner** remarked that the expense of a library such as Dr. Perring had suggested was a serious deterrent.

J. E. **Lousley** drew attention to the exchange system practised by public libraries, which allowed rare works to be borrowed for up to three weeks. Other members, however, had found there was very often a veto on taking such volumes home.

D. E. **Allen** mentioned that the London Library, which possesses many county floras and more or less complete runs of periodicals such as the *Journal of Botany*, allowed its members to borrow almost any volume for several months at a time—if need be, by post. The ten-guinea subscription, however, would probably deter the majority of Recorders.

E. B. **Bangerter** was sure the Society would be quite willing to lend back-numbers of its own publications to *bona fide* borrowers such as Recorders.

Dr. **Perring** reminded members that it was up to the B.S.B.I. to ensure that the Nature Conservancy was made aware of botanical Sites of Special Scientific Interest. E. B. **Bangerter** added that the Nature Conservancy already had an unpublished list of these, which needed to be notified to local officers.

Dr. **Margaret Bradshaw** spoke next on "Recruiting the New Entry". In her experience relatively few persons becoming interested in botany could be recommended to join the Society. Its publications were beyond their scope and few of its meetings were held in places reasonably accessible for those who lived in the more out-of-the-way parts of the country. At present those who could be recruited were likely to be drawn from four main sources: university students, most of whom intended to become professional botanists; the Wild Flower Society, which was not keen to expand its membership; local natural history societies, an overrated source in her view, as few had botanist members competent enough to train beginners; and training colleges, which at the moment were being almost completely neglected.

She suggested various means by which the intake of beginners might be improved. The Society, for example, could set up in each Region a panel of leaders for special "teaching field meetings" made up of ten to twenty people. These leaders would need to be reasonably competent in the field without necessarily being experts. A panel of lecturers would similarly be useful. In both respects the Society might find it helpful to work very closely with university extramural departments and the Workers' Educational Association, which would be able to assist with secretarial work.

Apart from these ways in which the B.S.B.I. could offer a range of special services to local societies, there were various functions of its own of a local nature, both existing and potential, to which beginners could be invited without necessarily being expected to join as members. Besides the now well-established week-end Regional Meetings, with their combined programme of lectures, exhibits and a field excursion, there was a need for series of instructional field meetings in different parts of each region, one or more of which could be devoted to groups such as grasses and sedges that caused special difficulty to the beginner.

DISCUSSION

E. F. GREENWOOD said that school biology teachers in general had a very deficient knowledge of plants. He knew that the Association for Science Education would welcome help in this direction and suggested that its local secretaries be contacted. Dr. Bradshaw agreed that this might prove very fruitful.

E. A. ELLIS felt that there was something lacking in the overall incentive offered to beginners and especially to young people. A wider approach was needed laying emphasis on the ecological interrelations of animals, birds and plants.

Dr. BRADSHAW considered it was essential for people to be able to identify their plants. We needed more trained botanists in order to carry out more ambitious co-operative projects. It was the B.S.B.I.'s special duty to provide this initial training.

J. E. LOUSLEY thought people needed to be told something interesting about plants, such as details about their history or biology, as well as being told their names. He agreed with Mr. Ellis that there was a need for more specific incentives, for better thought-out themes of study, and for challenging organised projects.

Dr. PERRING questioned whether working through local societies was really worth the time and effort involved.

Mrs. A. H. SOMMERVILLE mentioned that in Aberdeen a large benefaction exists for promoting just such a training service in fieldwork, which has proved highly successful. She suggested that every local officer might be made responsible for organising one local meeting in the course of the next year.

Dr. C. T. PRIME rounded off the theme with a talk on "Books for the Beginner". He began by recalling his own experience as a schoolboy botanist and cited the books which had helped—and those which had not. The beginner, he emphasised, lacks the eye and the necessary background of experience to be able to spot the plants he wishes to see. As far as he was concerned, he would have been glad of much more help than he was able to obtain.

The position to-day had much improved and there was now a whole series of excellent books for every grade of field botanist. There was still, however, a noticeable gap in the literature between the highly scientific and the ultra-popular, and he felt there was a good case for the new, more popular type of journal that the Society currently had under consideration. Such a journal, he was convinced, would need to have a wide, all-embracing approach, providing a corrective to the excessively compartmentalised character of professional botany to-day. It should not be restricted to taxonomy, for the intellectual qualities needed to produce good taxonomists are relatively rare in the population at large and the appeal of this particular type of approach was unlikely to be widely shared. If the B.S.B.I. did not cater in some way for the new public for botany that was coming into being, he was sure another society would.

Dr. Prime closed by showing a 'mock-up' of the first number of the proposed new journal and gave an outline of its contents.

DISCUSSION.

E. A. **ELLIS**, greeting the idea of a new journal with enthusiasm, suggested possible future topics might include plant galls, teratology and distribution by slugs.

Miss M. A. **TURNER** thought it might be better to aim at a more ephemeral magazine than the rather impressive format currently being considered. Dr. B. **SEDDON**, on the other hand, found this format appealing and remarked on the resemblance to that of high-quality journals like *Discovery*.

Mrs. B. H. S. **RUSSELL** stressed that if a new journal was to be launched, it must fill a genuine gap and not compete with the Society's two existing journals.

D. E. **ALLEN** said there was a great need for more low-priced local 'Floras' consisting of little more than a checklist with localities. These could be purchased in quantity and distributed free to schools and others in an area who were known to be interested. They were a great stimulus to beginners. E. A. **ELLIS** instanced the recent checklist of the flora of Herm.

At the end of the session members were shown round the Botanic Garden by the Director, J. S. L. Gilmour, a former President of the Society. In the evening a reception was held in the Cory Room in the Botanic Garden offices, at which J. Faulkner showed colour slides of Cambridgeshire species with special emphasis on those of interest from a conservation point of view.

SUNDAY

The morning of the second day was spent visiting two sites in the care of the Cambridgeshire Naturalists' Trust. Hayley Wood, an Educational Nature Reserve, was toured under the guidance of Dr. Perring and Mr. Faulkner, while at Thriplow Meadows Mrs. G. Crompton described the grazing-and-cutting experiment on a *Dactylorhiza* population that she had been carrying out.

SESSION 3. FIELD-WORK. *Chairman*: J. E. LOUSLEY.

Opening the afternoon session with a paper on "Rare Species and their Management for Survival", Dr. A. S. WATT reminded us that the amount of knowledge which we possess about the biology of flowering plants which can help in a scientific policy of conservation is ridiculously small. Conservers are obliged, for a variety of reasons, to rely on simple agricultural practices in the management of nature reserves, such as grazing, burning, felling, etc. Yet in very few cases did we know the precise effects of these activities on our rare species. If we are ever to be able to control the populations of our plants, we must learn as much as possible about their biology, life history and ecological requirements.

The outsider might regard the Breckland group of rarities as a homogeneous collection all limited to that region for similar reasons, but detailed investigation had shown that they fell into six categories, different types of management being required for the conservation of species within each.

Dr. Watt maintained that members of the B.S.B.I. could help in the acquisition of this knowledge if they would make continuous observations on the population changes of rare species and correlate these with changes in treatment and fluctuations in the weather.

Dr. B. FORMAN opened his paper "Conservation: How can the B.S.B.I. help?" with a plea for a greater increase in the education of the public in general and naturalists in particular on the modern approach to conservation. We had to attempt to control our extremists whilst not dampening their enthusiasm. We had to learn to co-ordinate the interests of all those who use the countryside for recreation and in this respect naturalists must not overassess their own relative importance. We had to try to find the maximum diversity in the minimum number of sites, and B.S.B.I. members could play an important part in selecting the best sites for conservation. With this information the Conservancy would be in a position to present a balanced account of natural history requirements when regional plans for land use were being prepared.

Dr. Forman also mentioned some other ways in which amateur botanists could be of assistance. The new survey of the Breckland flora, initiated by the Nature Conservancy, was being carried out under the chairmanship of E. L. Swann, B.S.B.I. Recorder for Norfolk. The survey had already, after only two years, revealed several unsuspected new sites of importance. This might be work for experts, but the relative beginner could help by taking some responsibility for the management of nature reserves and sites of scientific interest, especially in collaboration with his local naturalists' trust.

DISCUSSION

It was pointed out that the schedules provided for contributors to the "Biological Flora" in the *Journal of Ecology* gave an admirable summary of the type of information required about our native species. There was a feeling that for some this type of approach would be too demanding, and a simpler project in which observations might be made throughout the country by many members on the change in population and reproductive capacity of one species was suggested.

E. A. ELLIS remarked on how little was known of the subtle interplay of factors responsible for the composition of the weed flora of arable fields. Careful and continuous observation might tell us much.

Dr. SEDDON, under the title "Group Projects: Value and Design", told of the progress of the Welsh Lakes Survey and the reasons behind its commencement, which was initially independent of the Welsh Committee. As a continuation in depth of the work of the Distribution Maps Scheme it was possible either to study the distribution of all species on a much larger scale in a smaller area, or it was possible to select a small group of species to study in greater detail over a large area. Most people appeared to have adopted the first of these alternatives. He had chosen the second. His reason had been that this method gave bigger ranges of soil and climate with which correlations in plant distribution might be made. The small group of species might be a taxonomic one or an ecological one. He had chosen the latter, as this restricted the number of sites to be visited and made choice an objective process which could be related, in the case of lakes, to the number shown to exist on the 1″ Ordnance Survey maps. They proved to be very unevenly distributed in Wales with three centres: in Snowdonia, in Mid-Wales, and at the heads of the South Wales valleys.

Dr. Seddon gave details of the preparation of the maps and showed how distribution patterns which appeared to be similar in Wales in the *Atlas of the British Flora* revealed different possible interpretations when analysed on this much larger scale.

There was little time for discussion, but the Chairman remarked that there was obviously great scope for similar studies in other parts of the British Isles.

After thanking all those who had spoken, the Hon. General Secretary then declared the Conference at an end.

Special thanks are due to Mrs. M. Briggs, the Hon. Meetings Secretary, A. C. Jermy and Dr. F. H. Perring (who kindly contributed the account of the last afternoon's proceedings) for organising this successful and enjoyable week-end which, perhaps, may prove to have been the forerunner of many more of its kind.

LOCAL OFFICERS ATTENDING

Regional Representatives on Council: Mrs. B. H. S. Russell, Mrs. H. R. H. Vaughan.

District Secretaries: Dr. M. E. Bradshaw, Miss V. Gordon, Dr. R. B. Ivimey-Cook, J. A. Kiernan.

Recorders: D. E. Allen, Miss E. P. Beattie, T. A. W. Davis, Miss D. E. de Vesian, Dr. J. G. Dony, E. A. Ellis, F. Fincher, E. F. Greenwood, Miss N. Hamilton, J. E. Lousley, Miss M. McCallum Webster, D. J. McCosh, Dr. F. H. Perring, Mrs. M. E. Pugh, Dr. B. Seddon, Mrs. A. H. Sommerville, E. L. Swann, Miss M. A. Turner, Mrs. F. L. Woodman.

EXHIBITION MEETING, 1964

An Exhibition Meeting was held at the Botany Department, British Museum (Natural History), South Kensington, London, S.W.7, on Saturday, November 28, 1964, from 2.00 p.m. to 5.30 p.m.

About 250 members and guests attended, and exhibits were arranged by 28 individuals and institutions. An account of these exhibits, based on notes supplied by exhibitors, is given below.

RANGE PATTERNS IN MANX RUBI

In the years 1958-63 the brambles of the Isle of Man, previously almost unknown, were studied in detail and the distribution of all but the commonest species mapped with some precision. The island has now been searched fairly exhaustively and it is not expected that the picture that has emerged will alter now except in minor details.

Some 40 species have so far been detected, though some of these cannot as yet be named. This compares with about 82 found by Mr. E. S. Edees in the much larger county of Staffordshire. Most of the Manx species are blatantly distinct even to a novice and only a few occur with any frequency. Four are very common and generally distributed: *Rubus ulmifolius*, *R. polyanthemus*, *R. nemoralis* and the northerly *R. errabundus*. Rather less common but also generally distributed are *R. sublustris* (partly adventive) and a very distinct bramble only recently recognised as *R. monensis* (ironically named after the other 'Mona', Anglesey).

Almost all the other species, from locally abundant to a mere bush or two, exhibit distinct distributions. In many other parts of the British Isles the diversity of soils and discontinuity of suitable habitats tend to hide range patterns in *Rubi*. But in Man the surface geology is largely uniform, suitable habitats continuous and little varied, and the main differentiating factors are rainfall and exposure. Idiosyncracies in soil preference are, in fact hard to find: *R. vestitus*, a southern species and well known in England as one of the few to thrive on basic soils, is largely confined to the relatively dry and less acid south-east corner; and *R. dumnoniensis*, a western species, shows a marked liking for the banks of streams.

R. hylocharis and *R. hebeticaulis*—both western in their Britannic range—form a neat species pair, the former being abundant in all the glens in the wettest north-central part of the island, the latter progressively replacing it in the glens in the rather less wet southern and eastern parts.

Each corner of the island tends to have its own special one or two species. This is in strong contrast to the pattern in almost all other vascular plants in Man; and indeed 'good' localities for *Rubi* are seldom productive of other plants of interest. These 'good' localities, where several local or rare species are met with together, are principally either old demesnes (which have escaped more recent clearing and alteration), or hedges bounding ancient trackways, or gently sloping cliffs sheltered from westerly gales. One of the cliff localities, where a rather insignificant ravine debouches half-way down the east coast, harbours a startling assemblage of thirteen species, four of them very rare.

In one or two instances, e.g. *R. rubristylus*, the species is extremely plentiful in just a single area and its occurrence wholly continuous. This pattern is suggestive of a spread by tip-rooting from a single centre of introduction and perhaps points to a recent origin in the island, brought over by birds.

Six of the named Manx species—including the common *R. monensis*—have not yet been certainly recorded from Ireland, in this respect joining the Isle of Man Cabbage and two of the very few Manx species of *Hieracium*. On the other hand, there is a recognisable Manx-Welsh element (also feebly reflected in the island's insect fauna) consisting of *R. lentiginosus*, *R. monensis*, *R. rubristylus* and *R. silurum*. *R. holerythrus* is the only true representative of the 'Lusitanian' element.

Much help in determining species from B. Miles and E. S. Edees is gratefully acknowledged.—D. E. Allen.

GALEOPSIS BIFIDA: A SPECIES

This exhibit demonstrated an experiment in crossing *Galeopsis tetrahit* L. *sens. str.* with its segregate *G. bifida* Boenn. The resulting seedlings were intermediate in their corolla characters, and they had a low proportion of normal pollen grains and of developed nutlets—evidence supporting the treatment of *G. bifida* as a full species. These synthesised hybrids were virtually identical with wild putative hybrids found by the exhibitor in Merioneth.

A specimen of the synthesised hybrid and watercolour drawings of corollas were exhibited.—P. M. Benoit.

THE *ACHILLEA MILLEFOLIUM* AGGREGATE IN BRITAIN

Achillea millefolium has been studied as an experimental taxonomic exercise by the Part II class. Material from Central Europe and different parts of Britain has been examined cytologically and samples have been grown in our experimental greenhouses.

All the British material studied has proved to be hexaploid, $2n=54$. We have also determined the chromosome numbers of several Austrian plants. Amongst our material are tetraploids ($2n=36$) and an octoploid ($2n=72$).

Achillea millefolium is a very variable plant in Britain; there appear to be several distict genotypes. A fuller account of our studies is in preparation.—D. Briggs, S. M. Walters and Part II Class (Botany School, Cambridge)

JUNCUS FILIFORMIS IN LEICESTERSHIRE

The new locality for *Juncus filiformis*, 90 miles from an isolated station in Mid-West York., and 140 miles from the nearest place where it occurs in any quantity, was described ecologically. Habitat photographs were shown, together with a list of associated species and a distribution map.—Mrs. P. A. Candlish.

PROGRESS IN THE STUDY OF THE HERTFORDSHIRE FLORA

This continued the theme of an exhibit entitled "A Five Year Plan for the Study of a Local Flora" shown at the 1963 Exhibition Meeting. There are now 43 species known to appear in all the Hertfordshire tetrads and these were compared with the 100 most common species in the London Area listed in *London's Natural History*, R. S. R. Fitter (1945).—J. G. and C. M. DONY.

A BOUNDARY PROBLEM

In April 1965, the following county boundary changes will be made:

1). Most of Middlesex and a large part of Hertfordshire will go to the Greater London Council.
2). A large part of Middlesex will be transferred to Hertfordshire.

The effect of these changes with regard to the Watsonian vice-county system was demonstrated with special reference to a part which was in Middlesex until 1890 and was then put into Hertfordshire and will, in 1965, be transferred to the Greater London Council.—J. G. DONY.

WOOL ADVENTIVES

Two mild autumns in succession have made it possible to show fresh material of wool adventives. 24 species gathered in flower in Bedfordshire on 26th November were shown and a prize for the greatest number of these correctly identified was won by John Mason.—C. M. DONY.

HISTORICAL LITERATURE RELATING TO PLANT REPRODUCTION

—Miss P. I. EDWARDS

BOTANICAL PAINTINGS

—Mrs. B. EVERARD

FLORAL POSTAGE STAMPS

Flower postage stamps from eight different countries were shown.—Mrs. A. N. GIBBY.

SOUVENIR OF THE TENTH INTERNATIONAL BOTANICAL CONGRESS

This consisted of some of the articles issued to persons attending the Congress which was held in Edinburgh, August 1964. These included an inscribed document case, preliminary circulars, final programme, badge, descriptive booklet on the Royal Botanic Garden, Edinburgh, illustrated catalogue of an Exhibition of botanical illustration held in the National Library of Scotland, a first-day cover of the special commemorative flower stamps bearing the Congress cancellation mark, and a photograph of the Higlander who 'piped out' members at the end of the final plenary session. —Mrs. A. N. GIBBY.

THE APPLICATION OF NUMERICAL TAXONOMIC METHOD TO THE GENUS *ONONIS* L.

This exhibit demonstrated some of the techniques of Numerical Taxonomy and illustrated them using the European species of *Ononis*.

This genus contains about 67 species, which are mainly distributed along both shores of the Mediterranean; few penetrate north to the Alps. There is a considerable range in the species concept in the genus, as well as a number of discontinuous characters, which make it an interesting study in this context.

The methods are based on measures of similarity between species, based mostly on morphological characters; to some extent, therefore, they simulate the mental processes of the taxonomist, but the results are unbiased in that the characters are not weighted in the calculations. Scoring these characters into one of two possible states allows the use of the association-analysis techniques of ecology, but the hierarchy produced was shown to be not very helpful, as it would only produce quite large groups of species. The use of multistate characters allows the calculation of either correlation coefficients or measures of taxonomic distance. Correlation coefficients can be used as the starting point of principal component analysis and models showing the distribution of both species and characters on the first three components were shown, in addition, further models showed the distribution of the species weighted by the characters and also of characters weighted by the species. The distance matrix was analysed by the "weighted variable group" clustering technique advocated by Sokal & Michener. This leads to the production of a dendrogram which gives a graphical representation of the similarities between the species.

The results were interpreted in the light of Sirjaev's monograph of the genus and it would seem that, although there is a considerable measure of agreement, at least in the broad divisions of the genus, there seem to be certain features which would benefit from further investigation. Modifications in the methodology will also be required not only to increase the number of characters studied, but also to find some method of overcoming the much greater range of variation found in some characters, which is a feature of plants rather than of the insects on which these techniques were first developed.—R. B. Ivimey-Cook.

CONFUSION OF *POA ANNUA* AND *PUCCINELLIA RUPESTRIS* IN THE FIELD

Specimens of prostrate, salt-tolerant plants of *Poa annua* were exhibited to show their striking resemblance to typical, prostrate plants of *Puccinellia rupestris*. These maritime forms of *Poa annua* are quite frequent in occurrence and a colour photograph showed them growing side-by-side with *Puccinellia rupestris* on the top of a sea-wall at Jaywick, Essex, which is a typical habitat of the latter species. It also grows behind sea-walls on bare, disturbed mud or where trampling reduces competition; it is the least halophilic of the British species and always grows, in our experience, well above the high-water-mark of spring tides. Specimens were also exhibited of the sub-erect form of *Puccinellia rupestris*, an ecad induced by an abundant supply of water during the growth of the plant, and hence rare in nature but similarly readily confused with more erect plants of the polymorphic *Poa annua*.

Thus, due to a resemblance in habit, general appearance and the overlap of ecological preference, the somewhat insignificant *Puccinellia* *rupestris* may be overlooked in the field in S. England (to the coasts of which it is virtually confined in the British Isles) owing to confusion with the ubiquitous *Poa annua*. The species can be distinguished by the following field and technical characters:

Puccinellia rupestris	*Poa annua*
Plant stiff, grey-green.	Plant soft, bright- or yellow-green.
Upper surface of leaves scaberulous.	Upper surface of leaves smooth.
Upper culm leaves with loose, inflated sheaths.	Upper culm leaves with close-fitting sheaths.
Panicle compact, compressed, unilateral.	Panicle usually lax, sometimes compact and compressed but not unilateral.
Spikelets subsessile (stalks less than 1 mm. long), subterete.	Spikelets stalked (stalks usually more than 1 mm. long), compressed.
Lemma rounded at the back, glabrous.	Lemma keeled, at least toward the apex and often hairy toward the base.
We have found it to occur sporadically in suitable habitats in Essex and Kent; it is usually regarded as a rare plant.	

—B. M. G. Jones and L. E. Newton.

AMBROSIA PSILOSTACHYA ESTABLISHED IN SCOTLAND

Ambrosia artemisiifolia was recorded by R. Prasher from dunes at Low Green south of Ayr v.c. 75 in the *Glasgow Naturalist* in 1953. This year it was reported still to be there, an unusual occurrence for that annual species. A visit to the locality on October 15, 1964, proved that there also, as had happened earlier in Lancashire, the species had been misidentified and was in fact *A. psilostachya*. This adds considerably to the areas where it is now well naturalised, these being Broughton Gifford Common in N. Wilts., v.c. 7; four localities in S. Lancs., v.c. 59; St. Anne's in v.c. 60, and now Low Green, or Seafield, in v.c. 75. It has been known in Lancashire since the last century.

The exhibit showed specimens of both these species and of *A. trifida*, plus a copy of the detailed note on the subject which will be appearing in a future issue of the *Glasgow Naturalist*.—D. McClintock.

FESTUCA RUBRA × *VULPIA BROMOIDES*, A NEW HYBRID IN BRITAIN

This hybrid was found at Littlehampton, W. Sussex (v.c. 13), on the edge of the golf course beyond the dunes, in August 1961. It was overmature and associated with dried mature specimens of *Vulpia bromoides* and scattered tufts of *Festuca rubra*. A portion of this plant was cultivated in my garden in London, and it flowered in June 1963. Examination of the floral characters confirmed that the plant is a hybrid betewen *F. rubra* and *V. bromoides*. The pollen-grains were empty, translucent and irregular in shape. The plant did not produce any seed in 1963 or 1964.

Morphological comparison of *F. rubra*, *V. bromoides* and their natural hybrid.

F. rubra	*F. rubra* × *V. bromoides*	*V. bromoides*
Perennial, rhizomatous, forming dense patches	Perennial, rhizomatous, forming dense patches	Annual, with culms loosely tufted or solitary
Basal leaves convolute, abruptly pointed or blunt	Basal leaves convolute, pointed	Basal leaves flat or convolute, pointed
Pedicels thin	Pedicels slightly thickened	Pedicels slightly thickened
Glumes subequal	Glumes unequal	Glumes unequal
Lower glume 2-3·5 mm. long	Lower glume 3·5-4·5 mm. long	Lower glume 3-6 mm. long
Upper glume 3·5-5 mm. long	Upper glume 6·5-8 mm. long	Upper glume 6-10 mm. long
Lemma narrowly lanceolate, 5-6 mm. long	Lemma linear-lanceolate 6-7 mm. long	Lemma linear-lanceolate, 5-9 mm. long
Awn of the lemma 0·5-3 mm. long	Awn of the lemma 5-7 mm. long	Awn of the lemma 1-1·3 cm. long.
Anthers 3	Anthers usually 3	Anthers usually 1
Pollen-grains normally developed, round	Pollen-grains empty, angular in shape	Pollen-grains normally developed

The analysis of characters shows that the hybrid is intermediate in some respects between its parents, but presents certain characters of each. The general appearance of the plant is similar to that of *F. rubra*, but the shape of the lemma, the length of the awns of lemma, the unequal length of glumes and the shape of the apex of basal leaves indicate a strong influence of *V. bromoides*.

Specimens of this hybrid with its putative parents and *F. rubra* × *V. membranacea* were demonstrated in this exhibit.—A. MELDERIS.

**ARISARUM PROBOSCIDEUM* (L.) SAVI, "NATURALISED" IN DORSET

Specimens of *A. proboscideum* collected by A. E. Mc.R. Pearce at Dorchester, Dorset (v.c. 9), in 1964, were exhibited.—A. MELDERIS.

MINUARTIA RECURVA

A herbarium specimen of the *Minuartia recurva* (All.) Schinz & Thell. collected in July 1964 on the Caha Mountains, W. Cork v.c. H.3) by the members of the Regional Field Meeting of the B.S.B.I. which was held in Bantry. The plant occurred in small cracks in large Old Red Sandstone slabs dipping steeply to the S.-E. Its height range is 1,800 to 2,000 ft. A few plants occur on the S. Kerry (v.c. H.1) side of the border. In Europe the plant is found on siliceous rocks in the Pyrenees, Alps, Carpathians and Caucasus.—J. J. MOORE.

CULTIVATION EXPERIMENT WITH *PUCCINELLIAS*

Puccinellia pseudodistans has been described as intermediate in morphology between *P. distans* and *P. fasciculata*, and it has been suggested that it is a hybrid between these species. In its habitat *P. fasciculata* is encountered as a relatively dwarf plant. In cultivation, however, it was observed that plants of this species soon assumed characters similar to those of *P. pseudodistans*. A plant which has responded to cultivation in this way was transferred to a soil-filled drainpipe so that the water supply at the roots would be reduced to proportions more like those in the natural habitat. The new growth and later inflorescences showed a return to the characters of *P. fasciculata.*

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*See Plant Notes, p. 125.—ED.

Following this observation and simple experiment, a series of cultivation experiments was planned in order to test the validity of the described differences between the three species concerned. The results suggest that *P. pseudodistans* and *P. fasciculata* are different phenotypes of one species, which is distinct from *P. distans.* Ecological, cytological and other data are now being examined to see where they confirm or refute this tentative conclusion.

The features of the three species as found in a natural habitat were demonstrated with herbarium specimens and a table showed the main differences between them. A photograph of the initial experiment was shown, and samples of the results of the later experiments were shown with photographs and a histogram.—L. E. NEWTON.

THE *LINIUM PERENNE* GROUP

The species in this group have attractive pale-blue flowers and are sometimes grown in gardens. They are rather similar in appearance to the cultivated flax, *Linum usitatissimum,* but are in fact quite distinct from it. The "*L. perenne* group" is widespread in central and southern Europe and reaches its north-west limit in England where it occurs in scattered locations in Cambridgeshire, Yorkshire and a few other eastern counties. The group is represented in N. America by *L. lewisii.*

This group is taxonomically difficult, because it is not at all easy to say how many species it contains and to give reliable characters for distinguishing between these species. Linneus recognised three species in the group (*L. perenne, L. alpinum, L. austriacum*) and since that time at least 15 more species have been described from various parts of Europe. Planchon, who treated the whole genus in 1840, concluded that as he could find no clear discontinuities in the variation in the "*L. perenne* group" it was best to treat the whole group as a single species.

The three Linnean species may be distinguished as follows:—

1. Stems less than 20 cms., decumbent to ascending, densely leafy .... *L. alpinum*
1. Stems 20-50 cms., ascending to erect, sparsely leafy .... 2.
  2. Pedicels erect .... *L. perenne*
  2. Pedicels reflexed .... *L. austriacum*

The habit of *L. alpinum* is related to its occurrence at high elevations, and is maintained when the plant is cultivated at low elevations. The two other species are lowland plants. None of the key characters given is constant and many intermediate plants occur. Furthermore there is considerable variation in habit, leaf width, sepal shape, petal size and fruit length—characters which might be of some taxonomic value. Because of the lack of reliable key characters there has been a tendency for plants in this group to be identified according to their geographical origin. Thus the plants growing in Cambridgeshire are called *L. anglicum* Mill. in Clapham, Tutin and Warburg although they are virtually indistinguishable morphologically from *L. perenne* and many of the collections made in England during that last century were in fact labelled *L. perenne.*

An experimental taxonomic investigation of this group is being undertaken in an attempt to understand the patterns of variation within the group. This may make it possible to put the formal taxonomy of the group on a surer footing. It is important to know how much variation there is in a single population and to what extent the variation in one population overlaps with that of a population growing in a different area or different country. These plants are long-lived perennials and the habit varies considerably according to the age of the plant. The leaf width and density of leafiness may vary widely on a single plant.

It is hoped to make crosses between plants of this group from different parts of Europe to test their infertility. The plants are heterostylic and self-sterile, characters which facilitate artificial crossing.

This group is not apparently complicated by apomixis but polyploidy may be of some importance. All the reported counts for the "*L. perenne* group" have been $2n=18$, apart from one for *L. alpinum* of $2n=36$. I have recently counted 3 populations of *L. anglicum* from the vicinity of Cambridge and they have $2n=36$. It has yet to be shown how widespread the tetraploids are. The difference in polyploid level does not seem to be correlated with any difference in pollen size, but it is noteworthy that the pollen grains of the diploid *L. perenne* and *L. austriacum* have only 3 furrows, whereas those of the tetraploid *L. anglicum* may have 4 pores or more. It is possible that the tetraploids have longer guard cells than the diploids, but this is not easy to show because the size of the guard cells varies according to the age of the leaf and the area from which they are taken.

I should be very grateful for any wild-collected seed of any of the species in the "*L. perenne* group".—D. Ockendon.

BOTANICAL PHOTOGRAPHIC PRINTS AND SOME HERBARIUM SPECIMENS.—D. and M. Parish.

DISTRIBUTION OF *RUBUS* SPP. IN THE BRITISH ISLES

Provisional maps of the distribution of twelve species of Brambles recently prepared by E. S. Edees were exhibited. These and four others prepared some years ago will be included in the supplement to the *Atlas of the British Flora* which it is hoped, will be published in the spring of 1966.—F. H. Perring.

SOME BRITISH ORCHIDS

Black and white photographs were shown of the following British orchids: Bird's Nest Orchid (*Neottia nidus-avis*), Man Orchid (*Aceras anthropophorum*), Bee Orchid (*Ophrys apifera*), Soldier Orchid (*Orchis militaris*), Monkey Orchid (*O. simia*), Fragrant Orchid (*Gymnadenia conopsea*), White Helleborine (*Cephalanthera damasonium*), Common Twayblade (*Listera ovata*), Common Spotted Orchid (*Dactylorhiza fuchsii*). —D. Pescod.

FURTHER DATA ON *ULEX MINOR* AND *U. GALLII*.—M. C. F. Proctor.

POLLINATION PHOTOGRAPHS.—M. C. F. Proctor.

WELSH REGION ACTIVITIES.—J. P. SAVIDGE.

PLANTS FROM IRELAND

Herbarium sheets of the following were shown:—

Salix hibernica Rech. fil.—from the garden of A. W. Stelfox, Newcastle, Co. Down (1961). The original cutting was from cliffs on N.E. face of hill, 2 miles S. of West end of L. Melvin, Leitrim (v.c H.29). The species has been recently described by Rechinger in *Österr. Bot. Zeitschr.*, **110**, 340 (1963).

Dactylis glomerata subsp. *hispanica* (Roth.) Nym.—from an island to the S.W. of the mouth of Glandore harbour, W. Cork (v.c. H.3), collected in July 1963. The specimen has been determined by Dr. Martin Borrill. It had not been previously recorded from Ireland.

Rumex hibernicus Rech. fil.—in flower and fruit, from the Mullet Peninsula, W. Mayo (v.c. H.27). Described by Rechinger in *Watsonia* **5**, 65 (1961),

Juncus bufonis subsp. *foliosus* (Desf.) Maire & Weiller from Ballyknockan, Wicklow (v.c. H.20), 1962. This plant has now been found in Dublin, Cork, Kerry, Sligo and Donegal.—Miss M. J. P. SCANNELL.

DISTRIBUTION MAPS OF AQUATICS IN WALES

Each species is tolerant of a range of nutrient conditions (defined in terms of the concentration and proportions of ions in solution in the lake water). Some have so wide a tolerance as to be almost ubiquitous, e.g. *Carex rostrata, Equisetum fluviatile, Littorella uniflora*, and these have no value as indicator species. Others are tolerant of conditions within narrower limits, none of them coincident and many of them overlapping to greater or lesser extent.

Maps were displayed showing the contrasting distributions of some species which illustrate the more distinct oligotrophic and eutrophic elements in the lacustrine flora of Wales. *Myriophyllum alterniflorum* and *M. spicatum* are species of similar habit but with different nutrient requirements which illustrate the distribution of the two lake types in Wales. *Polygonum amphibium* is confined to waters of high nutrient content and this is reflected in its restriction to the coastal and border lowlands and the larger river valleys. *Littorella uniflora* is the most ubiquitous of the aquatic species proper. It grows in lakes of low nutrient status (oligotrophic) as well as in those with high content of dissolved nutrients (eutrophic) and from sea-level to 2,750 ft. Its distribution is a faithful reflection of the distribution of lakes in Wales. The map for *Isoetes lacustris*, which is usually found in nutrient-poor waters, demonstrates the concentration of such lakes in the north and west, as also does *Lobelia dortmanna*.

All the maps shown were, in effect, 'dot' maps, the dot corresponding in size to a 'tetrad', i.e. 2 × 2 km., but each representing one site. Maps of *Luronium natans* were shown as examples to compare the more detailed presentation of the 'dot' map with one employing 10 km. square units. —B. SEDDON.

EXPERIMENTAL TAXONOMY OF *BROMUS*

The exhibit consisted of a number of herbarium specimens of British bromes in the Bromium (=Serrafalcus) section of *Bromus*. Specimens in the *Bromus mollis* aggregate, and *B. lepidus* were displayed to illustrate scatter diagrams showing the continuous variation seen between these taxa when large numbers are scored. The exhibit did not include scatter diagrams of *Bromus ferronii* but this taxon, and some other curious coastal bromes were displayed as herbarium specimens. By reference to this morphological analysis and also to recent cytogenetic work, the hypothesis was developed that the inland component of the *B. mollis* agg. arises from hybridisation and human selection. A diploid variety of *Bromus secalinus*, introduced with imported grass seed, was also on show.

The exhibit included an account of the serological technique used at Birmingham to discover the interrelationships of the genus *Bromus*, and its species. Specimen diffusion and immunoelectrophoretic plates relating to British taxa were shown and the methods of interpreting the data were discussed.—P. SMITH.

During the afternoon a series of colour transparencies were shown in the Lecture Hall by the following members:—

Dr. MARGARET BRADSHAW	Conservation Problems
T. G. COLLETT	Wild flowers in Ireland
Mrs. A. N. GIBBY	Franco-British Field Meeting, Paris, 1964
J. E. LOUSLEY	Highlights of 1964
Dr. & Mrs. M. PARISH	Northern Lights

The Exhibition was followed in the evening by the President's Reception at which 70 members were present.

MEMBERSHIP SECRETARY'S REPORT FOR 1964

One hundred and thirty four new members joined the Society during 1964. This was 64 fewer than in 1963 and 12 fewer than in 1962. Of the new members, Professor Rolf Nordhagen was elected as an honorary member, 83 were ordinary members, 36 were junior members, 11 were subscriber members and 3 were family members.

Losses were 85. This was 14 more than in 1963 and 40 more than in 1962. Forty-four members resigned, and 27 ceased to be members under the operation of Rule 29. We deeply regret having to record the death of the following 14 members:—Hon. Mrs. G. Baring, Mrs. C. M. A. Cadell, G. W. Collett, Miss E. G. Cordiner, A. J. Dodd, Mrs. F. Elder, Mrs. R. S. K. Eyre, F. W. Holder, Miss M. Isaac, J. Parkin, Rev. Canon C. E. Raven, E. M. Rutter, Mrs. W. E. Warren, and A. W. Westrup.

New Ordinary members are:—J. Adams, Mrs. V. K. Ansell, Rev. J. E. Beckerlegge, Miss M. Benson, C. Breen, Dr. D. Briggs, B. J. Brooke, Rev. E. Brunning, C. Bucke, Mrs. P. A. Candlish (rejoined), Miss L. E. Cobb, R. J. Cook, Mrs. M. E. Davies, Rev. N. Dennis, J. E. Dobson, Miss E. M. Ellis, J. O. Evans, Lt.-Col. C. Floyd, Miss A. C. M. Folan, G. Fry, Mrs. G. M. Gent (rejoined), A. Gibson (rejoined), Mrs. K. E. Gibson, R. B. Gorer, B. Gregson-Allcott, Sqn.-Ldr. P. Halligey, Mrs. P. A. Hannon, J. P. Hardman, R. C. Hardwick (rejoined), Miss E. J. Harling, Dr. H. C. A. Harris, Dr. B. L. Heydon (rejoined), Mrs. J. K. Higman, J. S. R. Hood, Dr. D. R. Humphreys, Miss J. L. Ivimy, P. W. James, J. E. L. Jones, F. V. Joyce, G. M. Kay, Q. Kay, P. R. Knipe, R. M. Langham, W. G. Latham, M. Long, Mrs. J. P. Matthews, Dr. M. E. Mitchell, Miss B. E. Moon, D. V. Morley, Mrs. C. Murdoch, J. H. Newton, Miss M. E. Newton, D. J. Ockendon, B. Oddie, E. F. Paul, C. B. Pead, B. J. L. Pentecost, D. Pescod, Mrs. S. L. Pollard, B. R. Radcliffe, Miss M. W. Reade, P. E. Richards, R. M. Rickard, Mrs. P. Rixon, E. W. Roffe, Miss K. M. Saville, Miss M. J. P. Scannell, Mrs. V. A. Sirett, Miss I. Spalding (rejoined), Miss U. Tetley, J. G. Treharne, R. Trewinnard, D. N. Turner, Mrs. H. A. G. Veal, A. S. Walker, L. Watson, Mrs. I. Weston, Mrs. W. Weston, L. S. Whicher, Dr. G. W. Whitall, A. G. Wilmore, R. A. Wilson, R. Woolley.

New Junior members are:—A. E. Backhurst, Miss J. M. Baker, E. N. Bent, R. Billington, H. J. B. Birks, M. F. Bloom, Miss A. E Bowerman, G. C. F. Clark, P. F. Cockburn, Miss J. M. Eachus, G. Fletcher, R. M. Francis, Miss C. Goss, A. L. Harrison, D. L. Hawksworth, R. A. Henderson, N. P. Holmes, D. L. Kelly, Miss H. H. Lees, J. L. Mason, M. G. Nash, Miss S. C. P. O'Brien, J. W. Patterson, J. E. Rees, G. D. Rugman, Miss K. Rushworth, F. W. Sayer, Miss P. J. Scott, M. P. Sharpe, D. W. Shimwell, M. Spray, C. H. Watts. T. P. Whiffin, J. White, J. D. Williams, B. E. Woodhams.

New Subscriber members are:—Aarhus Universitet Botanisk Institut; Association of School Natural History Societies (rejoined); Bournemouth Natural Science Society; Canford School; Hardley County Secondary School; Norwich Castle Museum; Poona University Library; Scottish Field Studies Association; Societas Botanica Cechoslovacia; Thanet Natural History Society; Tottenham High School for Girls.

New Family members are:—Mrs. E. A. Burrows, Mrs. T. G. Collett and Miss B. E. Russell.

January 1965. C. M. Dony.

SOUTH-WESTERN REGIONAL MEETING FOR 1964

A South-western Regional Meeting of the Society was held in the Department of Botany, University of Exeter, on Saturday, 19th September, 1964. About 30 members and friends were present to hear papers on a wide variety of subjects.

After a short address of welcome by Professor J. Caldwell, Miss D. Masters gave an account of her work on the pebble-bed commons of E. Devon. These are situated on the Tertiary Budleigh Salterton Pebble beds, on a north-south ridge, 6 miles long and 1·5 miles wide. The area receives 30-40″ of rain per annum and the soil is an incomplete or interrupted podsol. It supports a considerable range of heath communities, dry heath on the top of the ridge passing through a variety of transitional stages to wet *Sphagnum* or *Molinia* bogs in the lowest areas. Bracken is limited to the better-drained sides of the valleys, while in a number of calcareous flushes, *Schoenus* bogs have formed. In discussing the future of the Commons' vegetation, it was suggested that if the current tendency for a decrease in burning and grazing continues, the heaths may gradually become wooded, by seeding from near-by Forestry Commission plantations.

Dr. J. Wilkinson then discussed the distribution of *Salix* in the Gower peninsula, with special reference to the *Capreae* group. In particular, the dense distribution of F_1, F_2 and F_3 "hybrid swarms", in a belt of approximately neutral pH where boulder clay thins out over limestone, was described, and preliminary comparisons were made with broadly similar areas in Devon around Torbay, Plymouth and Branscombe.

After a break for coffee, Dr. M. C. F. Proctor gave an illustrated talk on various aspects of photography as it affects biologists. In particular, the merits of a range of cameras for particular types of photography was discussed, as well as problems of technique associated with natural history photography in the field.

After lunch, which was taken in the University Staff Club, the afternoon session opened with a paper by Dr. L. C. Frost (Bristol), who described the main factors affecting the establishment and growth of *Ulex europaeus* on the Lizard, Cornwall. These are: 1) climatic and microclimatic, particularly droughts with high insolation, salt-laden winds, especially in the late spring and cold, severe winters; 2) topographical and micro-topographical, especially the relation of aspect to sun and sea, slope and drainage, as well as shelter afforded by projecting spurs of rock, soil or vegetation; 3) biotic, particularly grazing by cattle, burning of gorse tussocks by man, and the presence of plant and animal parasites——Dodder and Cuckoo Spit (*Philenus leucothalmus*). Detailed observations have been made on a single gorse tussock since 1956, about half of which is contained within a 1 × 1 m. permanent quadrat. Four *Ulex* seedlings have been found since this time—3 were killed by drought and the fourth by drought and grazing. Through die-back of shoots on the exposed side of the tussock, this edge has "retreated" about 20 cm., while on the landward side, the frontier has "advanced" about 40 cm., since 1956. There is a marked zonation of grasses around the tussock, with *Festuca rubra* abundant on the exposed side and *Dactylis glomerata* on the sheltered side. Three of the rare clovers are present from time to time in the quadrat; none were present after the severe winter of 1962/63. Similar factors appear to control the establishment and growth of *Calluna vulgaris, Erica cinerea* and *E. vagans.*

Dr. R. B. Ivimey-Cook then discussed the application of recent taxonomic techniques to the genus *Ononis*, techniques which have only become practicable with the widespread availability of computers. Various methods of analysis are available, ranging from those essentially similar to those applied to ecological data—i.e. the Association Analysis technique devised by Williams & Lambert, to the more involved cluster analysis or principal component analysis. One of the most serious problems is the range of variation found in any population of the same species, coupled with the plasticity of many characters in response to changes in environment. Results so far obtained suggest that none of the methods at present in use is wholly satisfactory, even to interpret relationships between aggregates of characters, still less the species (or other taxon) which these character aggregates purport to represent.

After a short interval for tea, A. D. Horrill (Nature Conservancy, Monkswood) gave an account of the dry-matter production and nutrient circulation in a Culm Measure wood at Whitestone, Newton St. Cyres, Devon. Estimates show that, above ground, oak produces ca. 4,800 kg/ha of woody material per year and, including leaves, 7-8.000 kg/ha per year. The circulation of sodium, potassium, calcium, magnesium and phosphorus was followed by sampling leaves of oak and *Vaccinium myrtillus* litter fall and decomposition, rainfall and soil. Significant amounts of nutrients are found in the sub-canopy precipitation—some, e.g. sodium and potassium, originate from sea-spray, others, e.g. potassium and phosphorus, are, for the most part, leached from the canopy. Economically, these woods are of low quality, as there is much small timber growing from old coppice stools, while regeneration is poor; the potential productivity could only be realised with a complete change in management.

Before the conclusion of the afternoon session, a meeting was held of those members normally resident in the South-west Region, at which Capt. R. G. B. Roe, R.N., was unanimously elected to represent the Region on the Council. Members were then free to examine various exhibits displayed in the Department, relating to the papers heard during the day. A number of members also took advantage of an offer by Professor Caldwell to be conducted around the Botanic Garden and glasshouses.

On Sunday, 20th September, an excrusion was held to see various aspects of the flora of Dartmoor. The first stop was at Fingle Bridge, to see Culm Measure oakwood to the south of the R. Teign. Also seen was one of the few localities for *Hypericum linarifolium*, although the plants were, by this time, almost over. The party then proceeded through Okehampton to Stourton and walked to Black Tor copse, the largest of the high altitude *Quercus robur* woods on Dartmoor, though less well-known than Wistman's Wood. On the return to Exeter, a stop was made just beyond Hexworthy where, a short distance from the road, *Wahlenbergia hederacea* occurs in some quantity. A short walk from here to the valley of the R. Dart showed *Thelypteris limbosperma* and *Hymenophyllum tunbrigense* in the valley woods, and, right at the edge of the river, *Sibthorpia europaea.*—R. B. IVIMEY-COOK.

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA

TENTH ANNUAL REPORT TO 31st DECEMBER 1964

The Committee met three times, twice in Perth and once in Glasgow, and held an Exhibition meeting jointly with the Andersonian Naturalists' Society of Glasgow on Saturday, 7th November, at the Department of Botany, University of Glasgow, by kind permission of Professor P. W. Brian.

Five field meetings were arranged but one (Braemar) was cancelled owing to the typhoid outbreak in Aberdeen, the remainder were: Cullen, Banffshire, June 20, led by Dr. Helen Caldwell (16); Isle of Islay, June 20-27, led by A. McG. Stirling (10); Glencoe, July 10-12, led by A. A. P. Slack (15). The figures in parentheses refer to the number of people present at each meeting.

The Exhibition meeting was attended by about 90 people, of whom about 50 were present for the evening session. Dr. H. F. Dovaston was unable to give his talk on Plants and History owing to illness and the Committee is indebted to B. W. Ribbons who, at short notice, gave a talk on "Recent discoveries in the Scottish Flora", which was enthusiastically received by the audience. The following exhibits were shown:—

Bidean nam Bian 1964 (A. A. P. Slack).
A Highland limestone flora (E. C. D. Todd and D. A. Walkinshaw).
Some recent Scottish moss records (G. Rodway).
Dryas and *Polycarpon* (Mrs. A. Cross).
Plants of Arran (Mrs. A. H. Sommerville).
New Records from basic rocks in Scotland
Hybrid *Cirsium* from Islay } (A. McG. Stirling).
Polypodium vulgare and *P. interjectum*
Scirpus and *Eleocharis* (Miss U. K. Duncan).
Flora of W. of Scotland; old Herbarium records and drawings (Dr. B. Lloyd).
Alisma lanceolatum (B. W. Ribbons).

During the evening colour slides from the year's field meetings were shown by Mrs. A. Cross, B. W. Ribbons and J. Watt, K. A. Beckett, A. McG. Stirling, A. A. P. Slack, Mrs. A. H. Sommerville and Miss E. Bullard.

During the year R. Mackechnie became a Vice-President of the B.S.B.I.

The modified Constitution of the Committee became operative with the election of four representatives of B.S.B.I. Scottish members at the Regional meeting in Glasgow on November 7. The B.S.E. had already appointed four representatives during October. Dr. N. M. Pritchard became Regional Representative on the Council of the B.S.B.I. Miss Beattie was co-opted by the Committee to fulfil the vacancy of Field Secretary left by Mrs. Elder's untimely death. Miss Beattie was later appointed by the B.S.E. A. A. P. Slack and G. Smith were appointed to the Committee by the eight elected members.

One one-day meeting, four two-day meetings, one week-end meeting and three longer meetings have been arranged for 1965. The Autumn Exhibition meeting will be held in Edinburgh on Saturday, November 6, in conjunction with the Botanical Society of Edinburgh. This will be slightly extended to include a few papers on recent research on the Scottish Flora, during the morning.

It is a pleasure to express thanks to the officers of the B.S.E. and B.S.B.I., particularly to Dr. J. G. Dony, through whom until recently most of the contact with the B.S.B.I. has been made, and to all those who have given freely of their time in helping the Committee carry out its activities. —D. Ratcliffe.

WELSH REGION REPORT FOR 1963-64

This year has been notable for several developments which have resulted from discussions by the Regional Committee. The first of these was the decision to produce a news-sheet for distribution to members resident in the Region. This was put into effect with the appearance of Welsh Region Bulletin No. 1 in January 1964 and subsequent issues in April and September, edited alternately by Dr. Savidge and Dr. Seddon. In response to interest among members outside Wales, a biennial subscription rate of five shillings (for six issues) has been approved.

The surveys reported in the last annual report have been incorporated in a new development which is the proposal to prepare material for the publication of a book dealing with the vegetation of major habitats in Wales, the Welsh flora and plant distribution within the Principality in relation to geographical, climatic and ecological factors. A Welsh Flora Sub-committee was appointed to consider the practical implications and the means of implementing the scheme.

The programme of field excursions was designed to gather data which would contribute to this publication. Also connected with the same objective, an intensive survey of selected one-kilometre grid squares spaced at ten-kilometre intervals, known as the "OO" Survey, has been planned to sample the Welsh flora a way that will permit statistical treatment of the results and the method has been put through preliminary field trials.

Progress was made in the de-centralisation of recorderships for Welsh counties with the appointment of recorders resident in or near Anglesey, Caernarvonshire and Denbighshire.

The Autumn Meeting was held in Bangor on 3rd October at which the morning session consisted in papers by F. C. Best, Conservator N. Wales) of the Forestry Commission on "Forests and Conservation", by Evan Roberts, Warden-Naturalist (Snowdonia) of the Nature Conservancy, on "Conservation and Flora of Snowdon", and by Dr. W. S. Lacey on "The North Wales Naturalists' Trust—the first two years". The afternoon session heard contributions by R. F. May on "The Flora of Carmarthenshire", by Dr. B. Seddon on "The distribution of some aquatic plants in Welsh lakes" and by Dr. J. P. Savidge on "The Welsh Regions Book on Plant Distribution in Wales". This was followed by the Annual General Meeting at which the Officers were re-elected and the Committee was re-elected with only one change.—B. SEDDON.

IRISH REGION REPORT FOR 1964

The first field meeting organised by the Irish Regional Committee was held in West Cork in July. It was very successful with an attendance of 24 and resulted in a new flowering plant (*Minuartia recurva*) being recorded for the British Isles. Recording was also carried out in 5 under-recorded squares for the B.S.B.I. Maps Scheme.

During the Summer, plans for a Flora of Connemara and the Burren were evolved and tested in the field. Recording cards have now been printed and a limited grant to defray field expenses has been obtained from the Praeger Fund. A sub-committee consisting of Prof. Webb, Miss Scannell, Dr. M. Mitchell and Fr. Moore has been set up to deal with the administration of this project.

The annual general meeting was held on 17th October. Terms of reference for the Irish Regional Committee were adopted and the new committee, consisting of 7 members, was elected. At the meeting, 4 short papers dealing with recent additions to the Irish Flora were read. Professor Webb also gave an outline of our plans for the Flora of Connemara and the Burren.—J. J. MOORE.

NORTH-WESTERN REGIONAL MEETING, 1965

The joint North-Western Regional Meeting of the Botanical Society of the British Isles was held in the Department of Botany, University of Manchester, on 18th and 19th September, 1965. The paper-reading session on the Saturday was attended by 57 members and guests and six very interesting and well-received lectures were delivered. The Chair was taken by Dr. C. A. Stace and E. B. Bangerter.

Dr. J. H. Tallis ('The changing flora of the southern Pennine moorlands') gave a resumé of the past and present floras of the peatlands of the southern Pennines and accounted for many of the changes which have taken place in the past few thousand years, particularly the causes and effect of peat erosion.

E. S. Edees ('The problem of *Rubus* identification') then described the major diagnostic characters of British Rubi, and outlined both their variability and variation. He emphasised that the great majority of 'species' were reasonably constant in appearance, and once well known could be easily recognised; the difficulty was that there were so many of them.

The last lecture before lunch was given by Professor C. D. Pigott ('*Tilia cordata* and *T. platyphyllos* in Derbyshire'), in which the occurrence and characteristics of lime in Derbyshire was described. Hybrid indices had given a good idea of the identification of these trees, most of which occurred very sparsely and were not completely characteristic of either species. Professor Pigott expressed the belief that lime formed one of the characteristic plants of the original Derbyshire limestone woods.

After lunch Dr. B. H. Green ('Vegetation changes in a Cheshire mire') gave an account of his work on the history of Wybunbury Moss, a peat bog of unusual structure partly floating on many feet of water. The present vegetation was related to its immediate history, and the possibility of the great depth of water being due to subsidence caused by salt extraction discussed. Many interesting aquatics, e.g. *Scheuchzeria palustris*, have disappeared.

Dr. A. J. Farmer ('Some observations on *Pyrola rotundifolia*') gave a well-illustrated account of *Pyrola rotundifolia* subsp. *maritima*, including a description of its spread in recent years, its present range, and characteristics of the habitats.

Dr. C. D. Cook ('Aquatic flowering plants and their evolution') provided an outline of his experiments on the adaption of aquatic angiosperms to their habitat, particularly with the reference to the development of different forms in different degrees of wetness. He showed that in many cases aquatic or terrestrial forms are not produced as a direct effect of the habitat (which is nevertheless the case in a small minority of plants), but in response to different day-lengths. This work is valuable in understanding the evolution of aquatic plants.

Concurrent with the meeting a series of exhibits were put up, including those by Drs. Cook, Green and Tallis, and E. S. Edees to illustrate their talks. In addition the vice-county recorders and their helpers staged demonstrations of work in progress in Cheshire, S. Lancaster and W. Lancaster. J. Birks and Miss H. Lees showed pictures of Scandinavian plants and an exhibit of the effect of prehistoric man on local vegetation. Professor J. N. Mills provided an exhibit on various pitfalls encountered in *Hieracium* identification, and Dr. C. A. Stace on the taxonomic use of the leaf epidermis.

At 5.0 p.m. a meeting of North-Western members, with A. Newton in the Chair, elected Dr. C. D. Cook as North-Western Representative, and afterwards a party toured the University Botanic Garden and greenhouses.

On Sunday a party of nearly 20 members and friends visited areas of botanical interest in north Cheshire under the leadership of A. Newton. Redesmere was first visited, and a typical mere and reedswamp flora, including *Cicuta virosa*, was examined. After lunch the party travelled to some I.C.I. waste lime dumps at Marston. Dumping finished about 30 years ago, and the vegetation now includes a number of interesting calcicoles which are very rare or absent elsewhere in Cheshire. Species noted included *Blackstonia perfoliata, Dactylorhiza fuchsii, D. praetermissa, Anacamptis pyramidalis, Gymnadenia conopsea, Epipactis palustris, Salix repens, Picris hieracioides, Inula conyza, Erigeron acer, Preissia quadrata, Pellia fabbroniana* and *Moerckia flotowiana.* Afterwards the B.S.B.I. group joined forces with a large number of members of the Cheshire Conservation Trust at Black Lake and Abbot's Moss in the Delamere Forest area. Both of these are Trust reserves and represent stages in the colonisation of deep water-filled hollows by oligotrophic vegetation dominated by *Sphagnum recurvum. Oxycoccus, Andromeda* and *Empetrum nigrum* were typical plants.—C. A. STACE.

MIDLANDS REGIONAL MEETING, 1965

A meeting of members resident in the Midlands Region was held in the Chemistry Lecture Theatre, University of Birmingham, on Saturday, 24th April 1965, by kind permission of the Department of Botany. The meeting immediately followed the Society's Annual General Meeting and was held in conjunction with the Society's 1965 Conference. About 20 members were present.

Professor J. G. Hawkes was elected to the Chair. The main business was to elect a Regional Representative to serve on the Society's Council. The Chairman announced that the only nomination had been that of Dr. D. M. Moore, proposed by Prof. T. G. Tutin and seconded by Dr. G. Halliday. Dr. Moore was elected by unanimous consent. Dr. Halliday, the retiring Representative, was thanked for his services.

The Chairman asked for any other business and gave the floor to Mr. D. E. Allen, Acting Secretary of the Development and Rules Committee, who re-iterated his remarks made at the A.G.M. on the need for Regions to set up Regional Committees. He further suggested that, in view of the number of Midlands county Floras in one stage or another of preparation, a useful week-end Regional Conference might well be organised. The Hon. Gen. Secretary supported this suggestion, for which the Chairman thanked Mr. Allen and, there being no further business, closed the meeting at 1 p.m.

E. B. B.

ANNUAL GENERAL MEETING, 24th APRIL 1965

The Annual General Meeting of members of the Society was held in the Chemistry Lecture Theatre, University of Birmingham, Birmingham 15, on Saturday, 24th April 1965, at 12 noon.

The President (J. E. Lousley) was in the Chair, and 51 members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. 5, Part 4, pages 397-398, were adopted.

Report of the Council

The Report of the Council together with the accounts for the year 1964 and the final Report of the Distribution Maps Scheme had been printed and circulated to all members. There were no queries and the Reports and accounts were adopted unanimously.

Election of Officers

The President, who was retiring after a four-year term of office, expressed his gratitude to the Officers and members of the Society for their help during this period. The Council had nominated Dr. E. F. Warburg as his successor. Dr. Warburg, who was unfortunately prevented by illness from being present, had played a great part in the re-planning of the Society after the war, had been Editor of *Watsonia* when that journal was becoming established and had served as a Vice-President of the Society. The retiring President, with great pleasure, declared Dr. Warburg elected.

The General Secretary expressed the thanks of members to the retiring President for his unfailing hard work on behalf of the Society. At his request Mr. Lousley agreed to continue to Chair the meeting.

It was agreed that a note of good wishes be sent from the A.G.M. to Dr. Warburg.

The Council had nominated Dr. C. E. Hubbard for re-election as Vice-President and his re-election was confirmed.

E. B. Bangerter had been nominated by Council for re-election as Honorary General Secretary, J. C. Gardiner as Honorary Treasurer, D. H. Kent and Dr. M. C. F. Proctor as Honorary Editors, Mrs. Mary Briggs as Honorary Meetings Secretary, and P. C. Hall as Honorary Field Secretary. The re-election of these Officers was proposed by Professor Webb, seconded by Mrs. Gibby and carried unanimously.

The Chairman expressed the Society's thanks to P. F. Hunt, who was retiring from the Office of Honorary Junior Activities Secretary. No nominations for this Office had been received, a fact which Council viewed with great concern, and an appeal was made for a volunteer to take on this post at a later date. In the meantime Miss S. B. Dickinson, a member of the Junior Activities Committee, had agreed to handle bookings for Junior meetings in 1965.

ELECTION OF MEMBERS OF COUNCIL

In accordance with Rule 10, Prof. J. G. Hawkes, Dr. S. R. J. Woodell and D. E. Allen retired and a further vacancy was created by the election of E. B. Bangerter to the post of Honorary General Secretary, J. P. M. Brenan, J. F. M. Cannon, J. E. Dandy, J. E. Lousley, Dr. F. H. Perring, Prof. T. G. Tutin and P. J. Wanstall had been nominated and a ballot was held to elect four members to serve on Council, Mrs. M. Briggs and P. C. Hall acting as scrutineers. Prof. Tutin, Mr. Lousley, Dr. Perring, and Mr. Wanstall were elected, their seniority being decided, in the order shown, by lots drawn by the Chairman.

ELECTION OF AUDITORS

The Council recommended the re-election of Messrs. Price, Waterhouse & Co., who had kindly agreed to continue this work on honorary basis. This was agreed.

OTHER BUSINESS

The Chairman announced that the Society had recently suffered the loss of its Patroness on the death of Her Royal Highness The Princess Royal. A letter of sympathy and regret had been sent to the Earl of Harewood and had been graciously acknowledged.

Prof. Webb expressed concern, as Recorder for twenty Irish vice-counties, at the suggestions which had recently been made regarding new duties for Recorders. The Chairman said that the system was intended to be elastic and it was obvious that Ireland would need special consideration. At his request, D. E. Allen, Acting Secretary of the Development and Rules Committee, gave an outline of the proposals still under consideration by that Committee. Regional Committees were to be approached to find out which duties were appropriate to their Secretaries and which to Recorders. It was hoped that other Regions besides Scotland, Ireland and Wales would either voluntarily or by direction set up Regional Committees, which would eventually relieve the burden on the Honorary General and Assistant Secretaries. It was thought that the post of District Secretary might be abolished. A proposal for a Records Committee, incorporating the existing Local Floras and Maps Committees and taking over some of the work of the Development and Rules Committee was being considered. Mr. Allen was thanked for his outline of the situation.

The Chairman declared the meeting closed at 12.47 p.m.

J. F. H.
E. B. B.

FIELD MEETINGS, 1963*

APRIL 15th to 29th, 1963. FLOWERS OF THE WESTERN ALPS.

Leaders: Dr. C. T. Prime and W. M. Baron.

Eighteen members attended this excursion, one of the most ambitious and successful that the Junior Activities Committee has planned. On arrival at Sisteron many new and interesting plants were seen within easy walking distance. Thus the nearby lower slopes of La Baume showed many kinds of vegetation like Oak woodland, abandoned pastures, damp flushes, cultivated fields, and in these there were many uncommon or rare British species, e.g., *Thlaspi perfoliatum, Muscari atlanticum, Colchicum autumnale,* in abundance. There were, too, several apparently British species which turned out to be different on closer inspection; for example the Ash was *Fraxinus oxyphylla,* the Oak *Quercus pubescens,* and the Alder *Alnus viridis.* It was, too, a great delight to see many new species, like *Cytisus ardoinii* on the hillsides, *Gagea arvensis* in the fields, and *Lathyrus vernus* in the woodland.

One of the first days was spent walking through the Bois de Molard where we were able to see *Crocus purpureus, Androsace chaixii, Lilium martagon, Polygonatum officinale* and many other attractive and interesting species. The ascent was made through the local lavender fields, and opportunity was taken to see something of the local crops and methods of cultivation. On Friday, April 19th, the party went by coach to the rest house near the summit of the Montagne de Lure (5,000 feet); though the mountain flora was disappointingly late, we were able to see *Saxifraga oppositifolia* in all its glory, as well as *Gentiana verna* just coming into flower, while the mountain scenery was everything that could be wished for. Coming down the slopes, the party left the coach to explore some of the areas of "garigue" and were rewarded with *Narcissus juncifolius,* sheets of *Potentilla tabernaemontani* and interesting shrubs like *Rhamnus saxatilis* and *Satureja montana.*

The general lateness of the mountain flora made the party decide to go further south to see the limestone flora near Fontaine de Vaucluse. On this occasion the weather was particularly superb, and the fountain from which starts a large and rapid river, rather like Malham cove on a much larger scale, was tremendously impressive. Behind and above it were great limestone cliffs bright with brooms, *Amelanchier* species, Coluteas and the like which repaid careful botanical exploration. Time was found to include in this trip a quick visit to Avignon and its bridge, though we were unable to fit in a visit to the Papal palace.

The success of this trip led up to the party's longest expedition—to the Mediterranean near Theoule via Grasse and Cannes. Once again the weather was superb, the Mediterranean as blue as it is painted, and the drive over the mountain passes provided some truly magnificent views of the Alpes Maritimes. The Mediterranean flora provided species of *Anthericum* and *Asphodelus, Erica arborea, Cistus albidus, Serapias neglecta,* and many others; altogether a marked contrast to the vegetation of the Alps in the neighbourhood of Sisteron.

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*Field Meetings arranged by the Committee for the Study of the Scottish Flora are indicated by †.

Later, having felt they had gained some knowledge of the Sisteron flora, the party attempted a transect up a mountain near Valbelle. This proved a valuable exercise, and the party was able to trace the zones of oak woodland, beech woodland and box scrub up to the grassy summit. Several new species were seen on this excursion, among the most interesting being *Fritillaria tubaeformis* and *Iris lutescens.* A further attempt to study the ecological aspects of the flora was made on one of the last days, when the party split into four, and each group was given a problem to study; some tackled the distribution of *Buxus* and *Amelanchier* on the northern and southern slopes of La Baume, while others studied the stages in the regression of the lavender fields as cultivation had been abandoned.

Mount L'Ane was ascended towards the end of the fortnight when the flora had made some progress; *Draba aizoides* and *Pulsatilla vulgaris* were seen in flower, while there were signs of *Paeonia peregrina* in bud. Added to these major excursions there was time to explore the valley of the Durance where we saw *Myricaria germanica* var. *dahurica,* quite a rarity of the district. Also, on shorter walks by local paths and roadsides, there were fields of *Tulipa sylvestris,* others dotted with *Narcissus majalis,* while the roadsides sprouted *Aristolochia pistolochia, Ophrys aranifera* and *Orchis purpurea.* Even the little wood behind our hotel, apart from being full of nightingales, contained a very nice Fritillary, *Fritillaria involucrata.* All the members of the party felt they had only skimmed lightly over the whole flora, but despite this, they returned with an enhanced appreciation of the Alps and the Mediterranean and with a determination to see them again as soon as they could.—C. T. PRIME and W. M. M. BARON.

†MAY 26th, 1963. GLEN (CALLANDER).

Leader: J. AITKEN.

This was a combined meeting of the Perthshire Scientific Naturalists' Society and the C.S.S.F. Twelve members were present. The party met at Callander and took the route through the older Forestry Commission woods, thence by way of the younger forest to the "pinnacles" which were searched for alpines. Some of the party proceeded to the summit of Ben Ledi. Owing mainly to the late snows and continuing cold wet weather, the flora was very immature for the end of May—*Saxifraga oppositifolia* was still in full flower, and the only other interesting plant seen was *Listera cordata* which was discovered growing under heather. As the weather had worsened it was decided not to climb any further but to return to Callander.—E. P. BEATTIE and A. W. ROBSON.

†JUNE 1st and 2nd, 1963. GLEN CRERAN and BEN SGULAIRD.

Leader: A. A. P. Slack

Most of the party had arrived on Friday night and stayed (rather widely scattered) in several hotels nearby. The first gathering was at 10 a.m. on Saturday, 1st June, when six cars containing nine members of the B.S.B.I. or A.N.G. congregated at a large tent erected near Loch Creran bridge. We proceeded to the head of Loch Creran and ascended the Allt Buidhe and so on to the shoulder of Ben Sgulaird. Two members of the party continued to the summit, but the rest explored the limestone area. Owing to the backwardness of the season this exploration eventually became a search on hands and knees for non-flowering specimens of plants known to be present. In this way the extent of the limestone was investigated and an occasional basiphilous plant was found beyond the limits of the outcrop. In particular, a small clump of *Dryas octopetala* was noted growing amongst granitic rocks fully 100 yards from the nearest surface limestone. The basiphilous plants seen on the limestone included *Silene acaulis, Saxifraga oppositifolia, Potentilla crantzii, Galium boreale, Arabis hirsuta, Dryas octopetala, Arenaria norvegica, Carex capillaris, Polystichum lonchitis, Rubus saxatilis, Oxytropis halleri* and *Draba incana*.

We gathered in the evening at the tent to compare notes and plan for next day. A member who missed the party reported later that he found *Salix myrsinites* on Ben Sgulaird about half a mile from the limestone area. Two other members who spent the day on the shores of Loch Creran reported little of interest.

On Sunday, 2nd June, wet habitats, as contrasted with Saturday's dry ones, were visited. The salt marsh at the head of Loch Creran is fairly extensive but rather monotonous. However, in addition to the ubiquitous *Glaux* and *Armeria* we found *Triglochin maritima, Aster tripolium, Silene maritima, Eleocharis uniglumis* and *Lycopus europaeus*. The fresh-water Loch Baile Mhic Chailein proved to be very interesting. *Alisma plantago-aquatica* and *Carex vesicaria* were abundant, *Utricularia intermedia* grew in the mud and *Potamogeton gramineus* in the water with *Nitella* sp. and *Chara delicatula*. The two most interesting plants however were too immature to be identified and a revisit by one of the members in August was required to establish their identity. They were *Luronium natans* and *Scirpus sylvaticus*.

The weather for these two days was everything one could wish. There was no rain, but hot sun and a cool east breeze made conditions delightful. The party disbanded on the Sunday afternoon in Glen Creran with very pleasant memories of the hills and glens of Appin.—A. A. P. Slack.

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†JULY 6th to 13th, 1963. FORT WILLIAM.

Leader: Miss E. P. Beattie

In early July a party of twelve met in Fort William with the high hopes of exploring the high limestone areas of the Ben Nevis range. As, however, this range can be dangerous in mist, we were rather at the mercy of the weather and, as it turned out, three days had to be spent elsewhere.

SUNDAY, 7th JULY. As the sun was shining in a sky of cloudless blue, we decided to explore the western side of Aonach Beag (4060 ft.). Leaving the cars at the car park at the head of Glen Nevis, we proceeded on foot to the ruins of steall and thence up the Allt Coire Guibhsacheen. Later, leaving the stream, we made direct for the cliffs. On this side the limestone is fugitive, but where it does occur, the flora is a rich one. Some of the party proceeded to the top, from which they had a magnificent view of the roof of Scotland and the Islands.

MONDAY, 8th JULY. As this was not a day for the mountains, we decided to visit Lismore Island in the lower part of Loch Linnhe and list its flora. For the Maps Scheme, it was included with part of the mainland of Argyll. It was found, however, that the distance to and from Appin, which also involved four Highland ferries in all, shortened considerably the time which could be spent on the Island. However, we divided into parties and mapped the upper end of the Island. As regards weather, it was a most fortunate choice, for the mountains on the mainland were enveloped in clouds as black as night while we had continuous sunshine except at the end.

TUESDAY, 9th JULY. Again the weather was against us so we visited Glen Roy in order to see the famous Parallel Roads. These were made when the northward-flowing glacier from Ben Nevis dammed up the entrance to Glen Spean, Glen Roy and Glen Cloy. Thus the waters flowing into these glens from the heights formed lakes over a thousand feet deep. The different levels of these lakes through time have left beaches high on the hillsides of to-day, and it is these beaches which are known as the Parallel Roads of Glen Roy. Once again although it was pouring on the high tops, we were bathed in sunshine. The meadows by Bohuntine farm were a mass of *Gymnadenia conopsea*, *Platanthera bifolia* and, much less frequently, *Platanthera chlorantha*. The afternoon was spent exploring several ravines which were rich in *Hieracia*. Specimens were collected and sent to Dr. C. West and P. D. Sell for determination. *Trollius europaeus*, *Cirsium heterophyllum* and *Vicia sylvatica* were noted in a meadow near Roy Bridge, while on and behind a wall in Spean Bridge was quite a large colony of *Hieracium exotericum*.

WEDNESDAY, 10th JULY. Although the weather was doubtful, we decided to visit the bastion cliffs of Stob Coire Easain (3545 ft.) by way of Leanachan Forest, near Spean Bridge, and then up the slopes above and west of the Allt Choimhlidh. Although the mist descended and we were nearly frozen, it cleared in time for us to explore the whole length of the cliffs. Only, however, in a very few small areas were there any arctic-alpines. Among the plants seen were *Saxifraga cespitosa*, *S. nivalis*, *S. rivularis*, *S. stellaris*, *S. oppositifolia*, *S. aizoides*, *S. hypnoides*, *Cochlearia alpina*, *Oxyria digyna*, *Salix herbacea*, *S. reticulata*, *Athyrium alpestre* with a little *Cryptogramma crispa* in the boulder scree, *Cerastium alpinum*, *C. cerastoides*, *Arctous alpinus*, *Loiseleuria procumbens*, *Juniperus communis* subsp. *nana*, *Vaccinium uliginosum*, *Chamaepericlymenum* *suecicum*, *Polygonum viviparum*, *Polystichum lonchitis*, *Empetrum hermaphroditum*, *Eriophorum latifolium*. Although the boulder field had to be negotiated with care, our main trouble was on the return journey when we had to cross a Forestry Commission young plantation. Here the ground flora was so long and dense that it obscured the drains beneath and, possibly, too, because we were tired—for we did not seem to have the same bother in the morning—first one and then another would suddenly vanish, falling full length into one of these concealed drains with maddening, monotonous regularity. Indeed, I can still hear a voice, in which the exasperation was barely concealed, asking "Is there much more of this?", and then a sickening thud. This area is rich in *Trientalis europaea*.

THURSDAY, 11th JULY. As the sun was shining brightly, we decided to explore the northern cliffs and corries of Aonach Beag, approaching them by the ridge between that mountain and Sgurr Choinnich Beag. Later we ascended to the ridge just west of the summit by a gully of moss-covered boulder scree, but we were unable to get near a large section of the cliffs in this gully owing to an extensive, deep snow patch. Both in vascular plants and bryophytes, Aonach Beag is incredibly rich. Among the plants seen were:—*Salix herbacea* (some of the leaves were galled), *Trollius europaeus*, *Saxifraga hypnoides*, *S. stellaris*, *Cerastium alpinum*, *C. cerastoides*, *Coeloglossum viride*, *Veronica alpina*, *Dryas octopetala*, *Deschampsia alpina*, *Armeria maritima*, *Salix reticulata*, *Sibbaldia procumbens*, *Cochlearia alpina*, *Epilobium alsinifolium*, *E. anagallidifolium*, *Pyrola media*, *Thalictrum alpinum*, *Sedum rosea*, *Silene acaulis*, *Rubus saxatilis*, *Poa flexuosa*, *Festuca vivipara*, *Lycopodium alpinum*, *L. selago*, *Selaginella selaginoides*, *Oxyria digyna*, *Vaccinium uliginosum*, *Asplenium viride*, *Carex panicea*, *C. demissa*, *C. dioica*, *C. saxatilis*, *C. atrata*, *C. capillaris*, *C. vaginata*, *C. bigelowii*, *Juncus trifidus*, *Cystopteris montana*, and *Luzula arcuata*.

FRIDAY, 12th JULY. We returned to Lismore Island where we hired a car which took the first party to the southern end of the island, returned, picked up the second party and conveyed them to the middle of the island. Lismore is about 9½ miles long and 1½ miles at its broadest. The highest point is the hill called Barr Mor 417 ft. 286 species were noted, among which were *Asplenium marinum*, *Ceterach officinarum*, *Phyllitis scolopendrium*, *Nymphaea alba*, *Nuphar lutea*, **Meconopsis cambrica*, *Hypericum humifusum*, *H. androsaemum*, **Mimulus guttatus*, "*Fuchsia magellanica*", *Polygonum cuspidatum*, *Coeloglossum viride*, *Listera ovata*, *Glyceria plicata*, **Inula helenium*, *Geranium lucidum*, *Saxifraga tridactylites*, *Carex binervis*, *C. diandra*, *C. distans*, *C. extensa*, *C. hostiana*, *C. lepidocarpa*, *C. paniculata*, *C. remota*, *C. pallescens* and *C. sylvatica*. Of special interest were *Salix* × *rubra*, near Achnacroish (N.C.R.) and *Rubus dunmoniensis*. Mr. Edees is certain of this species, but although he has named the other two specimens sent, he is not absolutely certain, not having seen the actual bushes, viz. *Rubus sublustris* and *R. polyanthemus*. This just shows how very difficult the Rubi are.

The writer wishes to thank those who took part in this most enjoyable Field Meeting. Miss U. K. Duncan, Miss V. Gordon, Miss A. McSwinney, Miss M. Mathieson, Mrs. Talbot, The Hon. Mrs. Waldy, Mr. and Mrs. W. G. Haythornthwaite, Mr. A. Bourne, the Rev. G. G. Graham and Dr. M. Hall. I also wish to specially thank Miss Ursula K. Duncan and Miss Vera Gordon for their splendid assistance which was so freely given.

†AUGUST 14th to 24th, 1963. ORKNEY ISLANDS.

Leaders: Miss E. M. BULLARD and Dr. F. H. PERRING.

The dates given above are only an approximation: some arrived before I did, some left before I did, but I hope it is true that by the time I left on the last Saturday the meeting was over and everyone accounted for. At the height of the meeting there were fifteen of us, and a very happy and convenient group we proved to be. With three private cars available and one hired we were able to get to all parts of the mainland either as a party or in groups, and when visiting other islands the kindness of passing motorists saved several disasters.

The object of the meeting was to study the distribution of the critical plants of Orkney as well as to visit and list as completely as possible some of the more remote islands of the archipelago which had not been fully covered during the last 10 years.

During the first 6 days our base was Kirkwall, the thriving centre of Orkney. On the first afternoon the whole party stretched its legs on the slopes of Wideford Hall, seeing two strange thistles, *Cirsium palustre* var. *ferox* and *C. arvense* var. *integrifolium*. On the Thursday, Saturday and Monday the party split into four groups, each visiting a different 10 km. square on Mainland. In this way the whole was covered with the exception of one very well worked near Kirkwall. It was interesting to discover that the most abundant Knot-weed is *Polygonum boreale*, only recently detected in Britain. *P. arenastrum* is also widespread, but *P. aviculare* is decidedly local. These three occur in the same order of abundance in Shetland (fide B. T. Styles). Eyebrights are a special feature of Orkney—especially as the most common segregate is *E. borealis* var. *zetlandica*—a very handsome plant, bushy yet covered in very large flowers. Experts in the group believe this should be regarded as a good species.

Despite glowering skies the whole party went to Hoy on the Friday, crossing from Stromness to Quoys on the M.V. *Watchful*. The rain held off—the larger party climbed in and out of the corries at the north-east corner of the island seeing many attractive species including *Poa alpina* discovered for the first time in Orkney only a few weeks before. A splinter group which struck southwards for the Knap of Trowieglen came across an enormous patch of *Rubus chamaemorus* whilst climbing the north side: a plant not seen before on Hoy—and only the second record for Orkney as a whole.

The Sunday we chose to join the Orkney Field Club for a day on Rousay was one of the most perfect of the whole summer: there was hardly a breath of wind and the sun shone continuously. The party spread to all parts of the Island and much valuable recording was achieved. *Pyrola rotundifolia* is the most celebrated Rousay plant: one group in searching for it failed to find it, but turned up instead *Orthilia secunda*. This was new to Orkney and extended the known northern limit in Britain by over 60 miles. Another British plant which reaches its northern limit on Rousay is *Galium sterneri*, refound with ease on Kierfea Hill at the north-east corner of the island.

On the Tuesday morning the party fragmented. Some stayed on the mainland but the rest boarded the '*Orcadia*' en route for the various islands which were to occupy our attention for the next 3 or 4 days. One group landed on Sanday, and from there got one member on to North Ronaldsay for a day. This was a most valuable visit as the island is difficult to get to and few records had been made in the past. After two days, this party crossed to Stronsay spending a further two days there, finding it an island that made up in fascinating dune vegetation what it lacked in numbers of species.

The second party landed at Pierowall in Westray and, by hiring a car, were able to visit most parts of that island. They were rewarded by finding *Scirpus maritimus* in the Bay of Tuquoy, a species not previously found in Orkney and also extending the known northern limit in Britain by about 60 miles. This party made a day trip to Papa Westray. Its flora is not rich, but *Primula scotica* is very abundant and was still in flower here at its northern limit on 22nd August. It was something of a shock to come across *Koeleria cristata* at the northern tip of the island growing in a sward almost entirely composed of *Salix repens*, *Empetrum nigrum* and *Calluna vulgaris*.

This brief outline perhaps indicates how much was seen and done in a short time. The arrangements were very complicated, yet no one was ever without a bed, or missed a boat, or a plane, or got left behind. The credit for this is almost entirely due to Miss Bullard, who devoted an immense amount of time to making the meeting successful. Without her help very little could have been achieved, with it we all came away feeling we had got to know the Orkney flora, had made a contribution to its study, and would go back again at the earliest possible opportunity. —F. H. PERRING.

BOOK REVIEWS

Joseph Dalton Hooker. By W. B. TURRILL. Pp. vi + 228. Thomas Nelson & Sons Ltd., London and Edinburgh. 1963. Price 21/-.

With his wide knowledge of the history of British botany, and in particular of the history and development of the Royal Botanic Gardens, Kew, the late Dr. W. B. Turrill was almost in a unique position to write this biography of Joseph Dalton Hooker, and most ably was this task carried out.

Born in 1817, of a famous botanical father, J. D. Hooker's early life and botanical and family background are fascinatingly outlined. His famous voyages to Tasmania, the Antarctic, New Zealand and the Falkland Islands, and his subsequent botanical exploration of India are documented with care and detail.

Further chapters in the book deal at length with his friendship with the great naturalist Charles Darwin, and the subsequent administration and improvement of the Royal Botanic Gardens, Kew, upon Hooker's appointment as Director in 1865. The book concludes with an historical assessment of Joseph Hooker's position in the history of botany.

This is a thoroughly readable book, and further establishes Hooker's position as one of the really great Victorian botanists.—D. H. KENT.

Check lists of the Vascular plants and Bryophytes of Warwickshire (v.c. 38) and surrounding vice-counties. Part (1). Vascular plants. By R. C. READETT, J. G. HAWKES and Miss D. A. CADBURY. Issued with Part (2) as a special number (vol. **20**, no. **4**) of the *Proceedings of the Birmingham Natural History Society.* Price 15s. 1965.

This check list, together with Part 2 covering bryophytes, is intended as a forerunner to the full county flora, but must be regarded as a valuable contribution in its own right. After a few introductory pages setting out explanations and the sources of records, the rest of the work is made up of information arranged in columns. These cover the name of the taxon, its inclusion or otherwise in Bagnall's *Flora of Warwickshire* and supplement, the number of 10×10 km squares in the county from which it has been recorded during the present survey (the total number is 39), its occurrence in vice-counties 23, 32, 33, 37, 38, 39, 55 and 57, the first record for Warwickshire, and a statement of frequency, habitats and (where appropriate) status. The vascular plants are covered in 44 pages and it is unlikely that British botanists have even been given so much information in so little space.

It is a disadvantage that the species are arranged alphabetically but this no doubt was the most efficient way of collecting the information together, and to have published it in systematic order would have taken more space and added to the cost. Subspecies and some varieties are included, and critical groups well covered. The editors have not scorned aliens and their assiduity in collecting records for other counties has provided us for the first time with an indication of the distribution of a number of interesting species in the Midlands.

This is not the first time an important county flora has been preceded by a preliminary work issued with the object of stimulating further collaboration and increasing accuracy. Davey's *Flora of Cornwall,* which ranks high by the standards of his times, was preceded in 1902 by a pilot account. Of this he wrote: "My *Tentative List* did just what I had expected of it; it stimulated to further and more systematic efforts those who had already been great helpers, and it brought to our aid a number of good botanists who until then were ignorant of the character and extent of our work" (Davey, 1909, *Fl. Cornwall,* p. lxii.). The Warwickshire check lists are likely to be equally successful, and a few examples taken from the aliens will serve to indicate how they draw attention to features requiring additional attention. The Michaelmas Daisies need more study; there is no mention of *Lythrum junceum* which could well be the basis of Bagnall's record of *L. hyssopifolia* from a garden and some of the records from other vice-counties, even though Bromwich's specimen has been checked; the only *Spiraea* mentioned is *S. salicifolia* from five squares and all eight vice-counties, but other hortal allies are more commonly established; and *Centaurea diluta* has surely occurred more than once and is not a garden escape but a bird-seed alien. The list, too, will stimulate intensified search for old records, the filling of gaps, and the checking of records for the adjacent counties.

This useful little book provides a portable check list for local workers, and a valuable work of reference for botanists elsewhere. While we will look forward with even greater eagerness to the County Flora, this preliminary publication is most strongly recommended as a sound guide to present knowledge of the plants of Warwickshire.—J. E. LOUSLEY.

Through the kindness of the Birmingham Natural History Society members may purchase copies of the Warwickshire List for their personal use at the reduced rate of 10/- each. Applications should be addressed to M. C. Clark, 1 Bettell Lane, Barnt Green, Birmingham.—ED.

The Concise British Flora in Colour. By W. KEBLE MARTIN with nomenclature edited by DOUGLAS H. KENT and a foreword by H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH. Pp. 232 including 100 plates. Ebury Press and Michael Joseph. London. 1965. Price 35s.

Members of the Botanical Society of the British Isles were exceedingly pleased to know that the life work of one of its oldest members was after all to be reproduced for a wider public to enjoy. It was 'after all' for they had admired Mr. Keble Martin's drawings at their Exhibition Meetings and expressed a sincere regret that no publisher could be found for them. Publication has now been made possible by the active interest of H.R.H. the Duke of Edinburgh and others to whom British botanists will be most grateful.

The project has been beset with difficulties as the drawings have been arranged on sheets from which none could be withdrawn or others added. The result is that Keble Martin sometimes drew two plants which botanists now consider to be only one and in other cases only one plant which botanists now consider to have a very closely related partner. These obstacles have been most skilfully overcome by having the text opposite the plates. This text is very necessary but its botanical jargon is unnecessarily wearisome and may deter many a beginner. Messrs. Fitter and McClintock did better.

English names are fortunately given greater prominence than scientific ones and they are, on the whole, excellent. The choice of Persian Speedwell for what Keble Martin and I in our youth knew as Buxbaum's Speedwell gives emphasis to the need for a standard list of English names of British plants. How many of the readers could really care that *Dactylorhiza fuchsii* (Druce) Soó is *Dactylorchis fuchsii* (Druce) Vermeul. or *Orchis fuchsii* Druce and is not their old friend Spotted Orchid?

The Concise British Flora will be cherished not for the text but for the hundred plates of which all but six are in colour. There are on an average fifteen plants drawn for each plate and these are arranged in so delightful a manner that they do not appear to be overcrowded. Keble Martin knows his plants so intimately and is so masterly an artist that the slight and almost imperceptible differences in appearance are faithfully depicted. Some plates are treasures and among these is one showing the roses. This has been re-produced on the dust cover and must have added considerably to the sales. Those that do not match this fail mainly in registering accurately the various tones of yellow and this in its turn affects the greens and browns. The book came when I was rounding off the distribution of our local buttercups and my eye had become accustomed to the difference in colour between *Ranunculus acris* and *R. bulbosus,* which are, by the way, shown here to be identical. It is a long time since I saw the original drawings but I felt then that their great value lay in their accurate representation of colour as well as form. Any faults that there may be are not in the drawings themselves but in their reproduction.

A work as delightful as this will lead many who now have only a passing interest in British wild flowers to look at them more closely.—J. G. Dony.

The Plant Cover of Sweden (*Acta Phytogeographica Suecica* **50**). Pp. x + 314. Almquist & Wiksells. Uppsala. 1965. Price Sw.Kr.72; Clothbound Sw.Kr.87.

The Swedish Phytogeographical Society has issued this fine symposium in honour of the seventieth birthday of Professor G. Einar Du Rietz and the contributions are from his active disciples. Arranged under four headings starting with a regional survey they cover most types of vegetation represented in Sweden in 43 well-illustrated papers and a valuable bibliography. Presentation in the English language provides readers in this country with a most welcome ecological account of Swedish vegetation. —J. E. Lousley.

Introduction to Botany. By H. J. M. Bowen. Pp. vii + 216, with 7 tables and 69 figures in the text. Newnes: London. Price 12/6 paper back; 18/- hard cover.

Dr. Bowen, until recently Hon. Meetings Secretary of this Society, is to be congratulated upon the remarkable manner that he has covered virtually the whole field of botany in such an excellent way in so small a tome. After a short introduction the book commences with an account of the simplest plants, single cells and their biochemistry, proceeding through the algae, fungi, bryophytes, ferns and fern allies to the Spermatophytes. Later chapters deal with the growth and development of seed plants, plant associations, evolution of plants, the uses of plants and the destruction and conservation of plants. The latter chapter contains some very interesting data on the effects of chemical and radio-active pollution on vegetation. The work ends with a very good glossary and a general index.

This little book is one of the most fascinating of its type that I have read, and is a veritable mine of information. It should find a place on every botanists' bookshelf.—D. H. Kent.

The Identification of Flowering Plant Families. By P. H. Davis and J. Cullen. Pp. 122 with 6 figures in the text. Oliver & Boyd, Edinburgh and London. 21 April 1965. Price 12/6.

The authors of this book have attempted to provide a key to the families of angiosperms native to or widely cultivated in the north temperate regions. The key is followed by descriptive notes on 225 families. The compression necessary to give all this information in 122 pages has involved the use of an extensive range of symbols and abbreviations. These are a little confusing at first but are conveniently defined on the back end-paper. Some of the terms used in the key will be unfamiliar and some familiar terms are used in an unorthodox manner. Thus it is necessary to read the section on the usage of terms carefully before attempting to use the key. Particular care is needed in the interpretation of the terms hypogyny, perigyny and epigyny as defined and used here.

The key is inevitably rather long and may be rather involved for a beginner. Practical tests, however, showed that fairly advanced students did not find it difficult to use. The book, therefore, succeeds in its purpose of providing a means of identifying plants to family level and in these days of specialisation it should be a useful reference work for all interested in plant identification.—J. Timson.

The Natural History of Upper Teesdale. Edited by D. H. Valentine. Pp. 70 and 2 photos, 3 figures and numerous black and white sketches. Northumberland and Durham Naturalists' Trust. Newcastle upon Tyne. 1965. Price 5/-.

As Professor Valentine says in his Editorial Preface, an account of the natural history of Upper Teesdale needs no apology—'The wonder is that it was not written long ago'. With this unpretentious booklet the Northumberland and Durham Naturalists' Trust is filling a surprising gap in the literature of British natural history. In its 80 pages are presented concise accounts of the local history, geology, flora and vegetation and fauna of that most famous of areas to the British botanist, the valley of Upper Teesdale above Middleton. This is an area which in 1965 has achieved an unwelcome notoriety; the opposition of the County Trust and the B.S.B.I. to the plans to construct a reservoir immediately above Cauldron Snout, culminating in the launching of a public appeal for an

Upper Teesdale Defence Fund, must have brought the issues of conservation in this lovely valley before an enormously enlarged audience. The publication of this booklet is, we are to assume, a coincidence, in that the Trust had obviously planned it well before the present reservoir threat; it is, nevertheless, most timely, and the closing chapter on conservation by Dr. D. Bellamy brings the urgent and the long-term problems squarely before the reader.

Teesdale is primarily a botanists' Mecca, and it is appropriate therefore that two chapters (by Dr. M. E. Bradshaw and Dr. W. A. Clark) should be devoted to the botany of the area; these chapters cover admirably not only the present-day floristics and ecology, but also the fascinating story of the past history of the Teesdale assemblage of rare and local species and its connection with the Ice Ages. The unique plant communities in Teesdale owe their survival to the remarkable geological features of the region, in particular the peculiar sugar limestone; Dr. G. A. L. Johnson supplies an excellent background chapter on the geology.

Teesdale's fauna is clearly less well studied than the flora, and the two chapters by T. C. Dunn and Dr. K. R. Ashby cover only the insects and the vertebrates. This is a reasonable decision, dictated by the available talent and knowledge; but the point is well made that there is an obvious gap in our knowledge, for it seems almost certain that the relatively sparse information on animal rarities corresponding to the botanical ones will be much enlarged in the years to come by the greatly accelerated study of these unique communities.

I have reserved till the end comment on the Revd. H. G. Proctor's account of man's activities in the dale, though naturally the book begins with this chapter. Mr. Proctor is clearly a local patriot, with the pride and the delight in the Teesdale scene which ensure that the story he has to tell is lively and full of interest. His style contrasts with that of the university scientists—but the contrast is itself refreshing, for it emphasises how much the British natural history tradition owes to this fertile cooperation and interplay between amateur and professional. The Northumberland and Durham Trust can congratulate itself upon a valuable addition to this great tradition.

The booklet is illustrated by two excellent photographs, three maps and diagrams and a number of black and white sketches. It includes references after each chapter, and an Appendix of Latin and English names of the plants mentioned. At 5/- (5/6 post free from the Editor, Botany Department, University of Durham) it is absurdly cheap. Buy it and send copies to your friends; it deserves to be widely known.—S. M. WALTERS.

PERSONALIA AND NOTICES TO MEMBERS

BRASSICA OLERACEA

Dr. Zacharias, Department of Genetics, Institut für Kulturpflanzenforschung, Gatersleben, Germany, D.D.R., is anxious to obtain seed of truly wild forms of *Brassica oleracea* growing on the south coast of England at least two or three miles from any cultivated forms.

BRASSICA OLERACEA

Miss Pauline B. Topham, Scottish Horticultural Research Institute, Invergowrie, Dundee, Angus, would be grateful for seeds of *Brassica oleracea* to grow plants for comparison with cultivated forms.

STELLARIA MEDIA

I. J. Gibson, B.Sc., Hatfield College of Technology, Hatfield, Herts., is investigating the alleged occurrence of apetalous *Stellaria media,* and would be very grateful for precise locations, herbarium specimens, and if possible, fresh material of this plant.

BRITISH BRYOLOGICAL SOCIETY DISTRIBUTION MAPS SCHEME

The British Bryological Society has for the last five years been mapping the distribution of British bryophytes, and would be grateful for assistance from members of the B.S.B.I. Further information and field recording cards may be obtained from Dr. A. J. E. Smith, Dept. of Botany, University College of North Wales, Bangor, Caernarvonshire.

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr. F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr. Perring (address as above) include:

1. 35 mm. filmstrips. 100 selected pairs of maps from the *Atlas,* price £2 per set.
2. Regional record cards. Price 15s. 0d. per hundred.
3. Individual record cards. Price 10s. 0d. per thousand.
4. Vice-county maps (quarto size): Collins' "New Naturalist" at 1s. 0d. each, and *Atlas of the British Flora* base maps at 3d. each.

5. Base maps of the British Isles with 100 km. grid (quarto) at 2d. each.
6. Corrections to the *Atlas of the British Flora*: free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed, would you please send us a copy?

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, articles, photographs and other materials relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF "WATSONIA" and "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1 and Vol. 5, Part 5, and *Proceedings*, Vol. 2, Part 4, and Vol 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to Mr. E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

CHANGES TO THE LIST OF RECORDERS

Since the last publication of the list of the Society's Recorders, revised up to January, 1964, the following changes have taken place:—

V.c. 17, Surrey	Dr. D. P. Young (replacing Mrs. B. Welch)
V.c. 22, Berks.	Dr. H. J. M. Bowen (replacing Dr. E. F. Warburg)
V.c. 24, Bucks.	P. R. Knipe (replacing Miss M. B. Hyde)
V.c. 32, Northants.	Mrs. G. M. Gent (replacing the late H. G. Allen)
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V.c. 50, Denbigh	J. M. Brummitt (replacing Dr. B. Seddon)
V.c. 52, Anglesey	R. H. Roberts (replacing Dr. B. Seddon)
V.c. 58, Chester	A. Newton (replacing Mrs. M. W. Cullen)

CHANGES TO THE PANEL OF REFEREES AND SPECIALISTS

The following changes have taken place since January, 1964:—

Ulex: add P. M. Benoit.

Lotus: delete J. B. Gillett (position now vacant).

Add *Mimulus*: R. H. Roberts.

Galeopsis etrahit L. agg.: add P. M. Benoit.

Add *Juncus bulbosus* s.l.: P. M. Benoit.

ORCHIDACEAE: P. F. Hunt (K) has taken the place of V. S. Summerhayes.

Dactylorhiza: add R. H. Roberts. P. F. Hunt (K) has taken the place of V. S. Summerhayes.

Carex: add Miss S. Hooper (K).

Two new Miscellaneous Subjects are:

Climate in relation to Plant Distribution: Dr. J. P. Savidge.

Infraspecific Taxa of British Phanerogams (references to descriptions and cultivation experiments): D. E. Allen.

DIRECTORY OF BRITISH AND IRISH TAXONOMIC AND ECOLOGICAL BOTANISTS

Through the co-operation of the six other national botanical Societies* the Development and Rules Committee has compiled a Directory containing over 700 names and addresses of British and Irish workers in botanical taxonomy and ecology; workers are also cross-referenced according to subject and geographical area (e.g., vice-county) being studied. In view of the great expense involved in printing such a directory, and the fact that much of the information would be out-of-date by the time of publication it was decided not to put this into print at this stage. The MS. is being kept in the Department of Botany at the British Museum (Natural History) and botanists requiring information from it may write to me at that address with their request. It is hoped that students who begin new lines of research will keep me informed; also I shall be grateful for any new addresses of those postgraduates who in the past three years have moved to a more permanent position with details of title, university and date of thesis submitted. It is hoped that we may be in a position to send data request-cards to all Universities and Colleges of Further Education at the beginning of each session so that records may be kept up-to-date.—CLIVE JERMY, Secretary, Development and Rules Committee.

THREATS TO BRITISH FLORA

Members are urged to report to D. Streeter, 193 London Road, East Grinstead, Sussex, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex), who will send a form listing the detailed information required by the

---

*British Bryological, British Ecological, British Lichen, British Mycological, British Phycological and British Pteridological Societies. The help of the Secretaries of these Societies and also of J. B. Evans, A. H. Norkett and J. R. Price of the British Museum (Natural History) is gratefully acknowledged.

Nature Conservancy. These forms have been prepared after discussions between the B.S.B.I. and the Consrvancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Secretary of the Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seed or any other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

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The London Natural History Society

This Society has sections covering all aspects of natural history and in particular botany and ecology. Lectures and field meetings are arranged and research work carried out. Most of these activities take place within the Society's area, that is within a 20-mile radius of St. Paul's.

Special attention is paid to botanical subjects in the Society's publication, "The London Naturalist", and the Botany Section has a herbarium. The Society has a library housed at Ealing Public Library and botanical journals are circulated to members through reading circles.

Further details can be obtained from the General Secretary:

Mrs. L. M. P. Small,
13 Woodfield Crescent,
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London, W.5.

Continued from inside front cover.

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OF THE
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Editor: E. F. GREENWOOD

Vol. 6 SEPTEMBER 1966 Pt. 3

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Continued on inside of back cover.

The late Dr. E. F. Warburg

OBITUARY

DR. E. F. WARBURG

FLORA OF THE BRITISH ISLES

Dr. Edmund Frederic Warburg, who died on Thursday at the age of 58, was a botanist with an international reputation as a plant taxonomist.

He was Warburg of Clapham, Tutin and Warburg, a trio revered by all botanists.

He was born on March 22, 1908, and owed his early interest in botany to his father, Sir Otto Warburg, a former chairman of the London County Council and a keen amateur botanist and horticulturist. Father and son together developed this interest to the point at which they became leading experts in the scientific study of the native and the garden flora of this country and also of the flora of the French Riviera. Already as an undergraduate at Cambridge Edmund was publishing joint papers with his father in the Journal of the Horticultural Society.

After leaving Marlborough in 1927 Warburg, "Heff" to his friends, went up to Trinity College, Cambridge, as an entrance scholar in mathematics. He was subsequently elected to a Senior Scholarship and was placed in the first class in both parts of the Natural Sciences Tripos, reading botany for part II. His first researches, in the new field of cytotaxonomy, were carried out under the supervision of Miss Edith Saunders and earned him his Ph.D. degree and a Research Fellowship of Trinity in 1933. After some years in Cambridge he joined the staff of Bedford College, London, but soon after the outbreak of war he joined the R.A.F. and was engaged in the interpretation of aerial photographs. After the war he was invited to the staff of the Oxford Department of Botany as Curator of the Druce Herbarium, where he had remained ever since. In 1964 he was elected Reader in Plant taxonomy and became a Fellow of New College.

Warburg is perhaps best known for his part in the production of the *Flora of the British Isles* by Clapham, Tutin and Warburg. This was the first comprehensive scientific flora of this country to be produced for over 70 years and was quite outstanding for its scientific quality. His considerable contribution to the research for this great work included among others the section on Rosaceae, which had been one of his long-standing interests.

OUTSTANDING BRYOLOGIST

Warburg's scientific reputation is not only based upon his work with flowering plants. He was also one of the outstanding bryologists of his generation. He prepared, besides many short papers in bryophytes, the third edition of the Census Catalogue of British Mosses for the Bryological Society, of which he was president in 1962 and 1963.

Heff was the most reticent and modest of men. As a scientist he was content to publish only a few works of real weight. His great influence arose from his enthusiasm for his subject, his commonsense and moderation in discussion and his immense patience with pupils, colleagues and amateur botanists of all kinds. He was a devoted and highly valued member of the Ashmolean Natural History Society as well as of the Botanical and Bryological Societies of the British Isles. His influence in biological matters in the Oxford Department of Botany and in the University generally was, in spite of his modesty and self-effacement, very great, and a steady stream of young men worked under his supervision even in days when research in taxonomic botany had become unfashionable.

In 1948 he married Primrose Churchman, of Melton, Suffolk. They had two sons and one daughter.

—Reprinted from *The Times* of 11th June 1966.

It is with great regret that the death on June 9th of our President, Dr. E. F. Warburg, is announced. It will be the duty of his obituarist in a subsequent number of this journal to give details of the many years' unremitting service he gave to this Society and, indeed, to the world of botany in general, but it is felt that this number should not appear without some tribute. Permission has therefore been obtained from *The Times*, to whom we are grateful, to reprint their Obituary Notice of June 11th, 1966.

As Secretary, I should like to take this opportunity to pay tribute to his firmness and willingness in giving decisions on any matter referred to him; his guidance will be greatly missed on Council. He was particularly concerned at our inability to find a Junior Activities Secretary and he attended all Junior Activities Committee meetings, where his advice was invaluable. His courage in leaving hospital to preside at our last Annual General Meeting is a measure of his determination to fulfil his presidential obligations. A letter of sympathy on behalf of the Society was sent to Mrs. Primrose Warburg.—E. B. BANGERTER, Hon. Gen. Secretary.

THE BRAMBLES OF LINCOLNSHIRE

By E. S. Edees

Augustin Ley (1908) seems to have been the first batologist to make a serious study of the Lincolnshire brambles, if we omit the records of F. A. Lees, whose specimens have not been seen. In 1907 Ley spent a fortnight at the height of the season investigating the *Rubi* which grew within easy cycling distance of Lincoln. He found Skellingthorpe Old Wood the most rewarding, but the woods near Wragby on the east side of the city and the Market Rasen heaths further north were also rich in species. In 1909 Ley presented a set of his Lincolnshire *Rubus* specimens to the City & County Museum at Lincoln. These were examined by W. C. R. Watson in 1949 and by myself in 1965. I have also examined a collection of Lincolnshire brambles at the Natural History Museum, Wollaton Hall, Nottingham, made by H. Fisher (1860-1935), chiefly towards the end of his life, from the woods near Grantham and Bourne. In 1965 I spent the last week of July collecting brambles from the stations most often visited by Ley and Fisher in order to confirm their records and make what additions to them I could. The present paper is a synthesis of their work and mine.

The nomenclature with a few modifications and the sequence of species are those of Dandy (1958). All the records rest on field observations of my own or on herbarium specimens which I have seen and approved. The result is a list of 42 names. This could be increased to 50 and perhaps even to 60, if all the plants that have been seen could be confidently determined. But in Lincolnshire as in other counties there are many puzzles. Species recorded by Ley (1908) and Watson (1958), which are not included in the present list, should be disregarded for the time being. In addition to the specimens of Ley and Fisher at Lincoln and Nottingham there are now about 120 recently gathered specimens of Lincolnshire *Rubi* in my own herbarium. The records which follow are arranged alphabetically within the two vice-counties 53 and 54. Undated records belong to 1965 and I am responsible for those that are not followed by a name. References to the 10 km. squares of the national grid are added in brackets.

I am very grateful to Miss E. J. Gibbons, Mr. and Mrs. J. G. Porter, Mr. B. A. Miles, and to the Curator and Keeper of Biology at Wollaton Hall for generous help in the preparation of this paper.

Rubus caesius L. Widely distributed and locally plentiful, especially on coastal dunes. Variable and hybridising freely with species of the *Triviales* group. 53: Bourne Wood (53/02); Careby Wood (53/01), 1913, Fisher; Doddington (43/97), 1856, Cole; Dorrington (53/05), 1915, Mason; Ropsley Rise Wood (43/93); Skellingthorpe (43/97); Stubton (43/84), 1903, Storer; Twyford Forest (43/92). 54: Broughton Wood (44/90), 1895, Peacock; Cadney (54/00), 1894, Peacock; College Wood (53/17); Hatton (53/17), 1895, Mason; Legbourne (53/38), 1893, Larder; near Louth (53/38); dunes north of Mablethorpe (53/48); Mother Wood near Aby (53/47); Scawby (44/90), 1895, Peacock; Stainton Wood (53/07).

R. nessensis W. Hall. Damp woods, uncommon. 53: Skellingthorpe Old Wood (43/97), 'just inside the gate towards Skellingthorpe', 24th June 1856, Cole. 54: Birch Holt near Lincoln (43/97), 1907, Ley; excellent and most characteristic specimens from a wood near Mareham le Fen (53/26), 1965, Mrs. J. G. Porter.

R. scissus W. C. R. Wats. Dry heaths and open woods, local. Ley considered this to be the commonest suberect species in Lincolnshire. 53: Skellingthorpe Old Wood (43/97), 1913, Fisher. 54: Birk Hall Wood, Tumby (53/25), 1932, Fisher; Kew's Holt near Lincoln (43/97), 1907, Ley; Lynwode Warren near Market Rasen (53/18).

R. plicatus Weihe & Nees. Dry heaths, uncommon. 53: Stapleford Moor (43/85). 54: College Wood (53/17), 1907, Ley.

R. eboracensis W. C. R. Wats. Very common throughout the county. This seems to be the prevalent representative in Lincolnshire of what batologists used to call *R. corylifolius* agg. 53: Copper Hill near Ancaster (43/94). 54: Kew's Holt (43/97); Muckton (53/38); Tattershall (53/25); Winterton (44/91), 1936.

R. sublustris Lees. Hedgerows here and there, but not common. 53: Eagle (43/86); Skellingthorpe Old Wood (43/97), 1907, Ley. 54: Near Elsham (54/01), 1907, Ley; Kew's Holt (43/97); near Market Rasen (53/18); between Market Rasen and Louth (53/28); Stenigot (53/28), 1892, Larder; Wrawby Moor (54/01).

R. scabrosus P. J. Muell. 54: Roadside near Muckton (53/38).

R. gratus Focke. Found in many places in the neighbourhood of Lincoln and one of the commonest brambles between Tattershall and Market Rasen. 53: Doddington (43/97); North Scarle (43/86), 1930, Fisher; Potterhanworth (53/06); Stapleford Moor (43/85). 54: College Wood (53/17); Lynwode Warren (53/18); abundant in woods and hedges at Market Rasen (53/18), 1907, Ley; Osgodby Moor (53/09); Stainton Wood (53/07); Tattershall (53/25); Walesby Moor (53/19); Woodhall Spa (53/16), 1926, Fisher.

R. calvatus Lees ex Bloxam. Generally uncommon, but fairly plentiful in Stainton Wood. 53: Barff Farm Covert, Blankney (53/06), 1931, Fisher; near Hartsholme Hall (43/96), 1931, FISHER. 54: Stainton Wood (53/07), 1907, LEY; hedge near a railway crossing, Tattershall (53/25).

R. CARPINIFOLIUS Weihe & Nees. Uncommon. Ley found only isolated bushes here and there. 53: West edge of Skellingthorpe Old Wood (43/97), 1907, LEY. 54: Hedges near Market Rasen (53/18), 1907, LEY; several bushes in one place by the roadside near Tattershall (53/25).

R. NEMORALIS P. J. Muell. One of the commonest species about Lincoln. Ley called it the most abundant and characteristic bramble of all those parts of Lincolnshire which he visited. 53: Barkston (43/94), 1934, FISHER; Doddington (43/97); Eagle (43/86); Skellingthorpe (43/97); Stapleford Moor (43/85). 54: Appleby (44/91), 1936; Holton le Moor (53/09); Market Rasen (53/18); Scotton Common (43/89), 1907, LEY; Stainton Wood (53/07); Tattershall (53/25); Wrawby Moor (54/01).

R. LINDLEIANUS Lees. Widely distributed throughout the county and plentiful about Skellingthorpe and Market Rasen. There are many excellent bushes by the roadside from the village of Skellingthorpe to the Old Wood. 53: Ancaster, in a plantation on the Willoughby Hall Estate (43/94), 1930, FISHER; Eagle (43/86); Harrowby Gorse, Grantham (43/93), 1913, FISHER; Newell Wood, Holywell (53/01), 1926, FISHER; Potterhanworth (53/06); Stapleford Moor (43/85). 54: Bardney, roadside by Southrey Wood (53/16); Kew's Holt (43/97); roadside between Kirkby on Bain and Roughton (53/26); Lynwode Warren (53/18); Mother Wood near Aby (53/47); Osgodby Moor (53/09); Stainton Wood (53/07), 1907, LEY; Tattershall, in a disused gravel pit (53/25); Waterloo Lane, Woodhall Spa (53/16), 1926, FISHER.

R. MUENTERI Marss. 53: Eagle, on the way to Spalford (43/86); Stapleford Moor (43/85). 54: Between Tattershall and Woodhall Spa (53/16).

R. MACROPHYLLUS Weihe & Nees. 54: Roadside by Mother Wood (53/47).

R. SILVATICUS Weihe & Nees. 53: Copper Hill near Ancaster (43/94), in the wood in the angle of two roads, 1931 and 1932, FISHER. It grows there still, but this is the only Lincolnshire station known to me. Ley's specimens are incorrectly named.

R. AMPLIFICATUS Lees. 53: Eagle, roadside towards Spalford (43/86); Hills and Holes, Heydour, near Ancaster (43/94), 1931, FISHER. 54: Between Kirkby on Bain and Roughton (53/26).

R. BELOPHORUS Muell. & Lefèv. 54: Stainton Wood (53/07), 1907, LEY (as *R. macrophyllus* forma). B. A. Miles rediscovered Ley's plant in a dark part of Stainton Wood in 1964, but he found only one poor example of it. I could not find it in 1965. Ley's specimen, which W. C. R. Watson identified with *R. belophorus*, is not *R. macrophyllus* and probably not *R. belophorus* either.

R. PYRAMIDALIS Kalt. 53: Skellingthorpe Old Wood (43/97), 1907, LEY (as *R. silvaticus*). 54: College Wood (53/17).

R. MACROPHYLLOIDES Genev. Ley recorded a bramble from the woods near Apley (53/17) which he named *R. silvaticus* Weihe & Nees, 'a form bearing a few acicles and glands on the stem'. I have seen it in Stainton Wood, Short Wood and Great West Wood, where it is abundant. Watson determined specimens from Short Wood and Spring Wood, collected by Ley in 1907, as *R. macrophylloides* Genev., but it is unlikely that this determination will stand.

R. POLYANTHEMUS Lindeb. Widely distributed and probably common, at least in the north of the county. 53: Five miles south of Lincoln (43/96), 1892, FISHER; Skellingthorpe Old Wood and canal bank near Lincoln (43/97), 1907, LEY; Stapleford Moor (43/85). 54: Holton le Moor (53/09); Market Rasen (53/18); Mother Wood (53/47); Tattershall (53/25); Wrawby Moor (54/01).

R. CARDIOPHYLLUS Muell. & Lefev. Apparently very local. 54: Holton le Moor (53/09); hedge near the railway station at Moortown (53/09), 1907, LEY.

R. LINDEBERGII P. J. Muell. 53: Harlaxton (43/83), in a sand pit, 1912, FISHER; Skellingthorpe Old Wood (43/97), 1907, LEY. 54: College Wood (53/17), 1907, LEY, and still there in 1965.

R. ULMIFOLIUS Schott. Widely but unevenly distributed. Common between Lincoln, Sleaford and Grantham. 53: Ancaster (43/94); Bourne (53/02); Eagle (43/86); Grantham (43/93); near Lobthorpe, Witham (43/92), 1932, FISHER; Potterhanworth (53/06); Scopwick (53/05); Sleaford (53/04); Threekingham (53/03). 54: Alford (53/47); Boston (53/34), 1909, L.N.U.; Howsham (54/00), 1907, LEY; Louth (53/38), 1894, ROGERS; Winterton (44/91), 1936.

R. PROCERUS P. J. MUELL. 54: Railway track near Tattershall (53/25).

R. FALCATUS Kalt. 53: Carlton-le-Moorland (43/95), 1934, FISHER; Foss Way, five and a half miles south of Lincoln (43/96), 1892, FISHER; Wilsford Heath near Ancaster (43/94), several fine bushes at the crossroads. 54: Wrawby Moor (54/01), 1907, LEY.

R. VESTITUS Weihe & Nees. Abundant in some places and probably common throughout the county. 53: Ancaster (43/94); Bourne Wood (53/02); Eagle (43/86); Potterhanworth (53/06); Stapleford Moor (43/85). 54: Bardney (53/16); College Wood (53/17); Holton le Moor (53/09); between Louth and Caistor (53/29); Market Rasen (53/18), 1907, LEY; Mother Wood (53/47); Muckton (53/38); Stainton Wood (53/07); Tattershall (53/25); Walesby Moor (53/19).

R. BORAEANUS Genev. Very local, but common in Bourne Wood (53/02). Fisher found it in the lane from Edenham in 1931 and I gathered it in the wood itself on the walk from Edenham to Cawthorpe.

R. DREJERI Jensen. 53: Harrowby Gorse (43/93) near Grantham, 1912 and 1913, FISHER. I have not seen this growing in Lincolnshire, but the specimens seem to be correctly named.

R. LEYANUS Rogers. 53: Bourne Wood (53/02).

R. MUCRONATOIDES A. Ley. Local. 54: College Wood (53/17); Stainton Wood (53/07). I am grateful to B. A. Miles for first recognising the identity of these plants with Ley's specimens from Hereford and Radnor.

R. RADULA Weihe ex Boenn. Still common in all the woods, east and west of Lincoln, where Ley found it in 1907. 53: Skellingthorpe Old Wood (43/97). 54: College Wood (53/17); Kew's Holt (43/97); Stainton Wood (53/07).

R. ECHINATUS Lindl. Hedgerows here and there, but not common, except perhaps near Grantham. 53: Barrowby Hanger (43/83), 1932, FISHER; Bourne Wood (53/02), 1926, FISHER; Eagle (43/86); Gonerby Gorse (43/83), 1913, FISHER; Harlaxton Gorse (43/83), 1913, FISHER; Skellingthorpe Old Wood (43/97). 54: Woodhall Spa (53/16).

R. ECHINATOIDES (Rogers) Sudre. 53: Skellingthorpe Old Wood (43/97). 54: Waste ground near Scunthorpe (44/81), 1907, LEY.

R. RUDIS Weihe & Nees. Plentiful in woods and by roadsides near Bourne and Grantham, but rare further north. 53: Bourne Wood (53/02), 1926 and 1931, FISHER; roadside east of Grantham (43/9535); west fence of lane on west side of Ropsley Rise (43/93), 1932, FISHER; Twyford Forest (43/92). 54: Claxby (53/47); Woodhall Spa (53/16), 1926, FISHER.

R. FLEXUOSUS Muell. & Lefèv. Fisher's herbarium contains many excellent sheets of this species. 53: Gunboro Wood (53/02); Old Hag Wood, Skellingthorpe (43/97), 1931, FISHER; Pillow Wood, Bourne (53/02), 1931, FISHER.

R. PALLIDUS Weihe & Nees. 53: Bow Wood, 1933, and Pillow Wood, 1926, Bourne (53/02), FISHER. The specimens seem to be correct, but I have not been able to confirm them in the field.

R. NEWBOULDII Bab. B. A. Miles tells me that this is the correct name for the north of England species that Watson called *R. spadix* and earlier authors *R. podophyllos*. Local. 53: North Scarle (43/86), 'lane towards Spalford cross roads, seen again when we turned right towards Eagle, lane from west end of village northward towards Wigsley', 1926 and 1930, FISHER; Stapleford North Moor Wood (43/85), 1932, FISHER. 54: Abundant near Grasby (54/10), 1907, LEY (Cottagers Dale Wood) and, 1931, FISHER (Plantation Lane). I have seen it in all these places. There are fine bushes at the cross roads in square 43/8568.

R. RUFESCENS Muell. & Lefèv. A woodland species. Apparently very local, but plentiful where it occurs. 53: Old Hag Wood, Skellingthorpe (43/97); Pickworth Wood, Doddington (43/96), 1931, FISHER; Ponton Park Wood (43/93); Skellingthorpe Old Wood (43/97), 1907, Ley. 54: College Wood (53/17), 1907, Ley.

R. hylocharis W. C. R. Wats. Most of the records are for woods and hedgerows on the west side of Lincoln. 53: Eagle (43/86); Old Orchard near Doddington (43/96); North Scarle (43/86), 1926, Fisher; Skellingthorpe Old Wood (43/97), 1907, Ley; Stapleford Moor (43/85). 54: College Wood (53/17).

R. dasyphyllus (Rogers) Rogers. Ley's statement, 'Generally distributed, but not abundant', seems to be correct. In view of the following records it is hard to understand Watson's (1958) assertion that it does not occur in Lincolnshire. 53: Bourne Wood (53/02); Copper Hill (Triangle Cover) near Ancaster (43/94), 1932, Fisher; Harlaxton Gorse (43/83), 1913, Fisher; Mickling Plantation, Marston (43/84), 1912, Fisher; North Scarle (43/86), 1926, Fisher; Old Orchard near Doddington (43/96). 54: Bardney, roadside by Southrey Wood (53/16); College Wood (53/17); Cottagers Dale Wood, Limber (54/10), 1907, Ley; between Louth and Caistor (53/29); Market Rasen (53/18); Osgodby Moor (53/09); Stainton Wood (53/07); disused railway track near Tattershall (53/25); Twigmoor Woods (44/90), 1907, Ley.

R. hirtus Waldst. & Kit. A bramble which Fisher named *R. viridis* is abundant in many woods near Grantham. It matches specimens from North Essex, where it is also common, which Watson called *R. hirtus*. 53: Boothby (43/93), 1912, Fisher; Bourne Wood (53/02); Cabbage Plot Wood, Castle Bytham (43/91), 1930 and 1931, Fisher; Ponton Park Wood (43/93), 1912, Fisher; Ropsley Rise Wood (43/93), 1926, Fisher; Row Wood (53/02); Smally Gorse, Stroxton (43/93), 1912 and 1931, Fisher; Spring Wood (53/02); Twyford Forest (43/92).

R. bellardii Weihe & Nees. 53: Bourne Wood (53/02).

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FURTHER NOTES ON VERONICA PEREGRINA L.

By E. B. Bangerter

Introduction

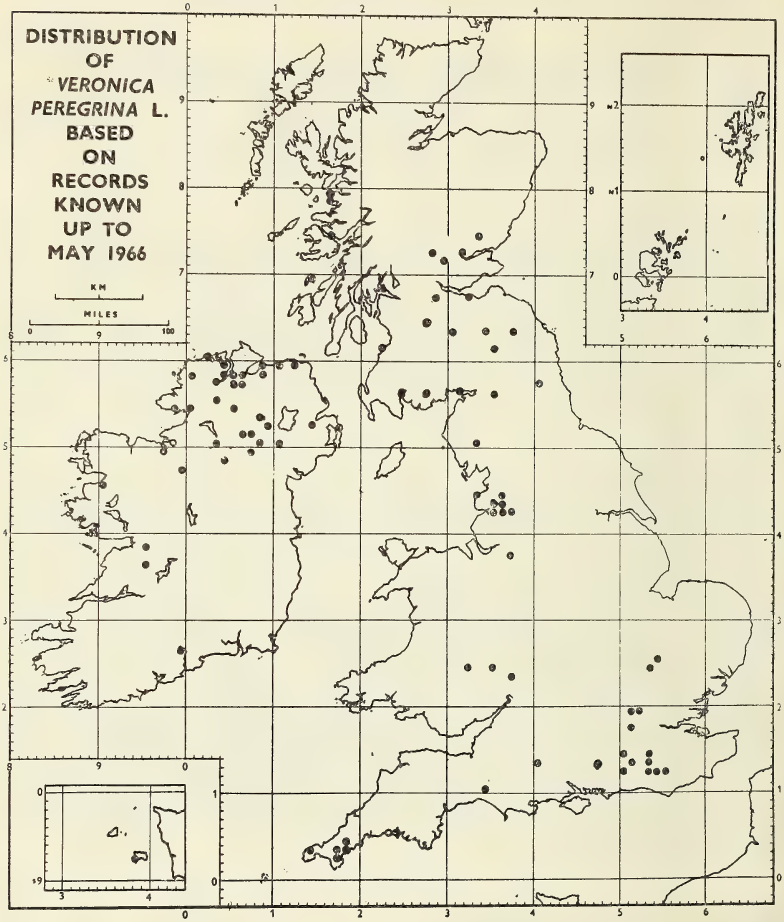
Since the publication (Bangerter, 1964) of my account of *Veronica peregrina* L. in the British Isles, further occurrences have been reported and several correspondents have sent me comments on and amendments to my distributional list. This information is brought together and presented with a map to show the known distribution of this speedwell in these Islands.

Description

I used the glabrous character of *V. peregrina* as one means of distinguishing that species from *V. serpyllifolia* but pointed out in a footnote that on the American continent subsp. *xalapensis,* with short gland-tipped hairs, occurs. An example of this variety, as it is now considered, has been found on a shoddy field in Hampshire by Miss Mary McCallum Webster. Pennell (1935) states that the gland-tipped hairs are usually present even on the capsule; the stem at least is usually covered with this short glandular pubescence quite different from the tight upward-adpressed puberulence of the stem in *V. serpyllifolia.* Although the capsules of the latter, especially in subsp. *humifusa,* may be glandular-pubescent, other characters are distinctive enough to separate the two species. The variety has as wide a range on the American continent as the typical form and even beyond it particularly in the west and north.

History as an Adventive

Through the kindness of E. Teague, who searched the herbaria at Edinburgh and Glasgow, further details concerning the early history of the adventive have come to light. W. Matthews collected the plant in Jersey in 1876; the year, 1873, and the collector, Mr. Turner, are additional to the sequence of gatherings from the well-known locality at Newton Don, Berwickshire; an undated specimen from Falkirk, collected by Dr. Glynwood, adds v.c. 86, Stirling, to the vice-comital list. The indefatigable J. Sim has another plant from his Perthshire nursery in the Edinburgh herbarium dated 1873, the specimen being accompanied by a partly-missing note, which nevertheless indicates that his flow of material was beginning to outdo its welcome; Buchanan White (1898) refers to Sim's locality but does not mention any of his several dates.



In much more recent times new records, often accompanied by specimens, have been sent from widely separated stations by my friends and correspondents. First, perhaps, I should mention Dr. H. J. M. Bowen's comment on the Dorset record in Good (1948), where the plant is described as "casual"; Dr. Bowen writes that "A. W. Graveson has had this in his garden at Beaminster . . . . for many years, so it is hardly casual there". Miss E. I. Biggar informs me that E. Milne-Redhead found the plant in E. Sussex at Wakehurst Place on a B.S.B.I. excursion in 1964. A new locality for Surrey, near Lingfield, was observed in the same year by G. I. Crawford. The two dots in Cambridgeshire on the distribution map in the *"Atlas"* (Perring & Walters, 1962) are further accounted for in the recent *Flora of Cambridge* (Perring, Sell, Walters & Whitehouse, 1964) by two grid references and gave rise to a query in my previous paper as to whether the species persisted in the original localities. John Raven, whose garden at Shepreth was responsible for one of the dots, not only sent me fresh material but commented that "it had a lapse of three or four years" and "shows no inclination to move further afield", confirming the recent existence and the usual behaviour of the plant. C. A. Howe, who recorded in S. Lancaster for the Distribution Maps Scheme, corrects a mis-reading of "Drindle" to "Brindle" and went to the trouble of arranging that G. Bolton, the gardener at Brindle Lodge, where it has been known "for a very long time", sent me a specimen last year. First evidence for over half a century of its occurrence in W. Lancaster was submitted in 1964 by Mrs. E. M. Pearce, who sent me fresh material from Thornton and wrote that "it is spreading rapidly"; further evidence came from Mrs. E. I. Hodgson, in 1965, when I received specimens gathered at Fulwood and a note of its discovery by her at Barton. Cheshire possessed the plant at Knutsford for a few years at least but no recent finds have been signalled; a note on the label of Col. A. H. Wolley-Dod's Sussex specimen, collected in 1940, says "seen also as a garden weed in Cheshire". Assuming that this means the Colonel himself saw it about that time, seventy years after the previous record, it is permissible to hope that it might be rediscovered in the vice-county.

From Scotland a number of new localities have been noted. My friend, S. W. Birnage, who kindly sends me observations on all species of *Veronica* growing in the Stonehouse area of Lanarkshire, included live specimens of *V. peregrina* in 1965 and in the same year added v.c. 73, Kirkcudbright, to the list on finding it at Palnure; this year he has noted it near Castle Douglas. The garden escape in Arisaig, Westerness, of over a century ago may be lost but the plant is now abundant within the walls of a garden in this area observed by J. Raven, who also saw a single plant in 1965 at Ardtornish in the same vice-county. Miss M. P. H. Kertland has furnished a few more details of the Irish records from Armagh and Down hitherto noted only from the Distribution Maps Scheme recording cards; these are incorporated in the distribution list below. From Tyrone, in which Irish vice-county it was first discovered, Capt. R. G. B. Roe has recorded *V. peregrina* as recently as 1965, confirming a continued occurrence there. The impression derived from various botanical literary sources that the species has been disappearing from N.E. Ireland must be a little revised by Miss E. J. Gibbon's finding it in 1965 at Ballycastle, over a century later than its last recorded appearance in Antrim.

I much regret a bad error in my previous paper, where I cited Wade & Smith (1927) as the source of the only Welsh record; I had carelessly read *"V. peregrina"* as *"Veronica"* instead of *"Vicia"*. My entry for v.c. 41 must therefore be deleted and I have no knowledge of the plant's existence in Wales. In this respect a comment by P. Benoit in a letter to me is of interest; he considers that the chances of finding *V. peregrina* "except possibly in the more lowland industrial districts" are slight "as so much of Wales is uncultivated and semi-natural".

An example of the var. *xalapensis* was discovered by Miss McCallum Webster in 1965 at Blackmoor in v.c. 12, N. Hants. Before the gathering was presented to the herbarium at Edinburgh with her alien collection, Miss Webster kindly allowed me to see the specimen, which unfortunately had the main stem broken or nibbled off, but bore the conspicuous gland-tipped hairs in some profusion. Arriving as a shoddy field introduction, it is the only example of this variety so far reported.

Conclusion

There is little evidence to suggest that conclusions arrived at in my previous account need qualification. Lack of recording may well be the reason for apparent disappearances, e.g. at Arisaig and in Antrim. Although the plant is plentiful in some stations it does not spread from them (the Thornton record may prove an exception to this rule); establishment in some localities has been confirmed, e.g. at Shepreth, but in my opinion the species cannot be regarded as naturalised as it still favours gardens and nurseries. A steady increase in the number of vice-counties in which it appears has also been maintained.

British and Irish Records

Amendments and additions to the list published in 1964 appear below and, as before, abbreviations used for Herbaria are given in Kent, Bangerter & Lousley (1958). Dr. F. H. Perring kindly supplied me with a map brought up to date with my (1964) published list and to this I have added a few dots, using the same method as employed in the *"Atlas"* (Perring & Walters, 1962); the 10 km. grid square number is cited with new records, Falkirk being placed in square 26/87. The number of known vice-counties in which *V. peregrina* has been recorded is now 45, counting Yorkshire (Cheetham & Sledge, 1941) as one.

CHANNEL ISLANDS

V.-c. 0. Jersey: 1876, *W. Matthews* (GL).

1. W. Cornwall: Killiow, 1906, *F. H. Davey*, add (E).

9. Dorset: Casual, Beaminster, 1937, *A. W. Graveson* (Good, 1945); "known for many years, hardly casual", 1965, *H. J. M. Bowen* in *litt.*

14. E. Sussex: Wakehurst Place, grid sq. 51/33, 1964, *E. Milne-Redhead*, comm. *Miss E. I. Biggar.*

17. Surrey: Vegetable garden on north side of the Lingfield Road, grid sq. 51/34, 1964, *G. I. Crawford* in *litt.*

29. Cambridge: Garden, Shepreth, 1965, *J. Raven* (BM).

(41. GLAMORGAN: delete "Splott, Grangetown, Cardiff" (cited in error)).

58. CHESTER: "seen also as a garden weed in Cheshire", *A. H. Wolley-Dod* (MS. note on label of v.c. 14 specimen in *Herb. Wolley-Dod*, BM).

59. S. LANCASTER: Vegetable garden, for a very long time, Brindle Lodge, near Hoghton, 1965, *G. Bolton*, comm. *C. A. Howe* (BM); correct "Drindle" in previous list to "Brindle".

60. W. LANCASTER: Spreading rapidly, Thornton, grid sq. 34/34, 1964, *Mrs. E. M. Pearce* (BM); weed at Barton Grange, Barton, grid sq. 34/53, 1965, *Mrs. E. I. Hodgson* in *litt.*; building site, Fulwood, Preston, grid sq. 34/34, 1965, *Mrs. E. I. Hodgson* (BM).

73. KIRKCUDBRIGHT: Walled garden, Cairnsmore House, Palnure, 3 miles east of Newton Stewart, grid sq. 25/46, 1965; garden, Threave Estate, one mile south-west of Castle Douglas, grid sq. 25/76, 1966, *S. W. Birnage* in *litt.*

75. AYR: for "Mary Cole" in previous list read "Maybole".

77. LANARK: Edge of herbaceous border, Stonehouse, grid sq. 26/74, 1965, *S. W. Birnage* in *litt.*

81. BERWICK: Newton Don, 1878, *Mr. Turner* (GL).

86. STIRLING: Falkirk, grid sq. 26/87, no date, *Dr. Glynwood* (E).

88. MID PERTH: near Perth, 1873, *J. Sim* (E); Auchterarder, 1950, *Miss M. McCallum Webster*, add (BM).

97. WESTERNESS: Hundreds of plants in walled garden, Traigh House, Arisaig, grid sq. 17/69, 1965; single plant in vegetable garden, Ardtornish, Morvern, grid sq. 17/64, 1965, *J. Raven* in *litt.*

H.36. TYRONE: Potato patch, Beltany Lodge, Mountjoy, near Omagh, grid sq. 05/54, 1965, *R. G. B. Roe*, comm. *F. H. Perring*.

H.37. ARMAGH: Killyleh area, 1956, *Armagh Field Club*, "probably *Miss Dawson*" (*Miss M. P. H. Kertland* in *litt.*).

H.38. DOWN: "Irish Square 15/72", post-1950, *Heslop-Harrison* (*Miss M. P. H. Kertland* in *litt.*).

H.39. ANTRIM: Garden weed, Ramoan, near Ballycastle, grid sq. 15/29, 1964, *Miss E. J. Gibbons* in *litt.*

var. XALAPENSIS (Kunth) St. John & Warren.

V.-c. 12. N. HANTS: Introduced with wool shoddy, Blackmoor Fruit Farm, Liss, grid sq. 41/73, 1965, *Miss M. McCallum Webster* (E).

ACKNOWLEDGMENTS

I am again indebted to many friends and correspondents, mostly mentioned in the text, who have done the real spade work in the preparation of this paper. To Dr. F. H. Perring for providing a base map and helping to pin-point records, I am especially grateful, as well as to Douglas Kent, who first suggested investigating *Veronica peregrina*.

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ERICA CILIARIS L. IN IRELAND

By D. A. Webb

On 26th August, 1852, John Hutton Balfour recorded in his diary (published by his son, I. B. Balfour, in *Notes R. bot. Gdn. Edinb.*, **2**, 155 (1902)) the following entry:

'Mr. Macaulay accompanied us in the car about a mile [from Roundstone] to show us a station for *Erica Mackaii.* On the road to Clifden we passed abundance of this heath, and at Craiggamore, in marshy ground on the left-hand side of the road, and in hollow ground, we gathered *Erica ciliaris*'. A briefer note to the same effect was published in the *Phytologist,* **4**, 1007 (1853)—a curiously laconic announcement for the first time in print of the existence of the plant in Ireland.

Balfour, however, though the first to publish, was not the first to find the plant, and must almost certainly have been told of its existence there when he dined with J. T. Mackay on 9th August, 1852, on his way through Dublin. Mackay did not publish his knowledge till seven years later, but in his 'Additions to the plants of Ireland since the publication of *Flora Hibernica*' (*Nat. Hist. Rev.*, **6**, 539 (1859)) he writes: '*Erica ciliaris.* Found by Mr. J. F. Bergin at Craig-a-more, between Clifden and Roundstone on the 14th September, 1846, from whom I received specimens'. And in the herbarium of Trinity College there is a specimen presented by Mackay in 1859, accompanied by a signed statement by Bergin, dated 10th October, 1846, that the specimen was part of his original gathering, and had been named by William McCalla, the brilliant schoolmaster of Roundstone whose death from cholera in 1849 was such a loss to Irish botany. (He was, incidentally, a son of the 'Mr. Macaulay' of Balfour's diary, who was postmaster.) There is also a specimen in the Edinburgh herbarium, collected by Balfour, and a duplicate of this at Cambridge. All are unmistakably *Erica ciliaris.*

The idea that *Erica ciliaris* might occur in Ireland had, however, seven years before Bergin's discovery, occurred to the fertile brain of a Corkman. In Babington's herbarium at Cambridge there is a sheet bearing the note: 'Mr. W. C. Nash, Dunown, Clonakilty, Co. Cork, 1839. See *Flora and Fauna of Co. Cork.* Not to be found there'. This is clearly one of the specimens to which Babington refers in his 'Hints towards a *Cybele Hibernica*' (*Nat. Hist. Rev.*, **6**, 536 (1859)) in the following words: 'There are in my herbarium three specimens of heaths, given to me by a person who marked, with his own hand upon the tickets, the exact spot where he said he had gathered them; but which, after having myself carefully examined the places (situated in the south of Ireland), I came to the conclusion never grew there'. The other two species are *Daboecia cantabrica* and *Erica mackaiana,* which Nash also sent out in 1839, ostensibly from W. Cork. If we turn to the *'Contributions towards a Flora and Fauna of the County of Cork',* by Harvey and others (1845), we find that Mr. Nash is already in serious difficulties, for he had not anticipated the complication that the British Association would visit Cork and that its members would want to see his rarities. His excuses are ingeniously varied; he states that the locality for *Erica ciliaris* has been ploughed up, that for *Daboecia* burnt over, and that for *Erica mackaiana* destroyed by baryta-mining.

Moore and More, in the first edition of *Cybele Hibernica* (1866) rightly pass over Nash's claims in silence, but accept Balfour's and Bergin's records of *Erica ciliaris* without question. They add a footnote that 'Mr. W. Andrews has lately informed us that he once gathered *E. ciliaris* on Monmor bog, between Kilrush and Kilkee, in Clare'. Little credence can be placed on Andrews's records, even when backed by specimens, as the latter were often garden-grown; but it should perhaps be remembered that Monmor bog provides a very outlying station for another Connemara plant, *Eriocaulon septangulare,* and it might, perhaps, be worth searching.

When twenty years had passed, however, without the plant being seen in Ireland, a sceptical note began to creep in. More in his '*Supplement to Cybele Hibernica*' (1872) writes: 'This must be very rare in the locality near Craiggamore, and neither D.M. nor A.G.M. have been able to find it'. And Babington, who had also had an unsuccessful search, annotated his Balfour specimen in 1876 with the comment, 'I suspect a mistake. C.C.B.'. Balfour, in consequence of these doubts, took advantage of the occasion of a British Association meeting in Belfast in 1874 to pay a hasty visit to Connemara in September to try to vindicate his claims. He writes (*Trans. Proc. bot. Soc. Edinb.,* **12**, 374-5 (1876)):—

'I remembered that I had gathered *Erica ciliaris* near a bridge, and we therefore inspected the ground near two bridges, but the plant was not to be seen . . . . When we came to a third bridge I at once recognised it as that which I had formerly visited. Since my return home I have looked at the notes of my excursion in 1852, and find the following entry: "Near Craiggamore, in marshy ground, on the left-hand side of the road and in hollow ground, we gathered *Erica ciliaris* at the bridge which is the third on going from Roundstone". We were sorry to find that the marshy ground was gone, the river was properly banked, and all the heath had disappeared . . . . Next day about two miles from Clifden we passed the bridge at which we had looked for *E. ciliaris,* and alighted to have another search. We met a gentleman, Mr Anthony Morris, who told us that this property (Ballynaboy) belonged to him and an English friend, and that he remembered at one time there was marshy ground and heath close to the bridge; that in improving his property he had banked the river, and so of course the heaths were destroyed, but they were so pretty he had transferred some plants to his garden. We accordingly went in to see them, in hopes that we might find a plant of the heath we wanted, but were disappointed'.

It will be noticed that the transcript from the 'notes' here given differs from the extract from the diary, printed in 1902, the locality being given as 'near', not 'at' Craiggamore, and the phrase about the third bridge being added. Dr. Fletcher has been kind enough to look up the original diary, which is preserved in Edinburgh, and finds that it agrees with the 1902 version. The discrepancy is hard to explain. Balfour had little apparent motive for falsifying the evidence. It seems just possible that the 'notes' were a fuller account than the diary, written up for publication; in this case the note about the bridge may have been added some days later when his memories were confused, some other plant, perhaps having been seen at the bridge.

By the end of the century Bergin, McCalla, Mackay and Balfour were all dead, and the growing scepticism could be voiced more freely. The second edition of *Cybele Hibernica* (1898) relegates the plant to an appendix, and states that the locality has been examined in vain by Babington, Moore, More and Balfour himself. The editors conclude that 'we can only assume that Mr. Bergin was the victim of an imposition, and that Professor Balfour's specimens were somehow mislabelled in the Edinburgh herbarium. Such a double assumption has no doubt all the appearance of an ingenious device to explain away very positive evidence, yet this evidence as it now stands is unquestionably insufficient to justify the admission of *Erica ciliaris* to the Irish flora'. And in 1934 Praeger (*The Botanist in Ireland*) included *Erica ciliaris* among 'unverified records and missing plants'.

During the years 1947-53 I spent a good deal of time in the Roundstone area, studying *Erica mackiana* and working out the limits of its range. I did not specifically hunt for *Erica ciliaris,* but I was keeping an eye open for any unusual heath. At the end of this work I was very sceptical of any possibility of its occurrence in Ireland.

In 1963 I received a note from the late Mrs. Gilson of Ambleside telling me she had found *Erica mackaiana* in a new station. On looking at the map I saw that this was barely a mile from its known area, so I filed the card away as a point of minor interest to be followed up some time. In March, 1965, I accompanied one of my students, Michael Lambert, to the Roundstone area, where he was doing an exercise on *E. mackaiana* and its hybrids. He mentioned to me that on a previous visit he had seen some 'very large *Erica mackaiana*' in a place that seemed to be the same as Mrs. Gilson's. That was what it looked like at first glance, but there were enough withered inflorescences to make it clear that it was really *E. ciliaris.* This was confirmed beyond any doubt when I saw it flowering the following autumn.

The question arises, is this station the same as those of McCalla and Balfour? As the total area occupied by the plant scarcely exceeds 10 square yards, I am reluctant to pin-point it exactly; but to assess the evidence fairly I must state that it grows in a hollow, with much *Molinia* and some *Juncus effusus,* about a mile north of the *Erica mackaiana* territory, and not far from the road. It agrees well with the rather vague indications given by Mackay and Balfour, if we eliminate the reference to the bridge; and this is surely justified if one realizes that Ballinaboy bridge, where Balfour talked to Mr. Morris, is almost on the coast and only two miles from Clifden; one would never refer to it as 'at' or even 'near' Craiggamore, which is a good five miles distant. Nevertheless, since my colony seems to have escaped detection for 113 years the possibility must be borne in mind that more of the plant may yet be found. I have searched the neighbourhood of the existing colony rather thoroughly for half a mile in all directions, but elsewhere along the road I have made only a superficial search.

Examination of a few capsules of the Connemara *Erica ciliaris* has so far failed to reveal any apparently viable seed. The plant flowers here very late (well into October) and it may be that chance variations of weather will determine whether seed is set or not; but it is possible that the same mysterious curse of sterility which broods over *E. mackaiana* in this region affects *E. ciliaris* too. There is no information as to whether the species is self-sterile; if it is the probable reduction to a single biotype or clone would, of course, account for the lack of seed.

There remains to consider whether any re-assessment of the status of *Erica mackaiana* is necessary in the light of the rediscovery of *E. ciliaris.* I have elsewhere (*J. Ecol.,* **43**, 319 (1955)) repudiated the suggestion that the former is a hybrid between *E. ciliaris* and *E. tetralix,* firstly because the known hybrid, of Dorset, Cornwall and France (*E.* × *watsonii* Bentham) is very different, and secondly because *E. mackaiana* had never been found growing in the neighbourhood of both its supposed parents. The second argument is now weakened (though it should be remembered that *E. mackaiana* does not surround *E. ciliaris* in the way that *E.* × *praegeri* surrounds *E. mackaiana*; it is a full mile distant). The first argument, however, remains; and although I have no doubt that plants similar to *E. tetralix* and *E. ciliaris* both contributed genes in some distant past to the ancestor of modern *E. mackaiana,* the latter now behaves as an independent species and should be treated as such.

I should like, in closing, to leave two reflections with the reader, though neither can be discussed here. This history demonstrates, in the first place, how very difficult it is to prove a negative in plant-distribution. Some types of country are, of course, easier to search than the bogs of Connemara; but it seems that every verdict of 'extinct' must be accompanied by a slight reservation. Secondly, what is the chain of circumstances which has led to the concentration in the Roundstone area of isolated colonies of three rare heathers (not to mention *Daboecia*), none of them known from Kerry and only one from Mayo? There are many square miles of apparently similar bog elsewhere, and the geologists assure us that the district was under ice in the last glaciation.

NOTE ADDED IN PRESS

An exceptionally extensive and severe bog-fire swept over the colony of *Erica ciliaris* in May 1966, and left only a few charred stems visible. One, at least, of the plants is alive at the base, and I hope that there will be a partial recovery, but it will hardly be worth anyone's while to visit the plant before 1968.

THE TWO JOHN BATEMANS

By D. E. Allen

In his report on the interesting discovery of a large pre-Linnaean hortus siccus, now in the museum of the Pharmaceutical Society of Great Britain, bearing on the spine the words "John Bateman, M.D., Coll. Med. Lond. Praes., 1718", Harrison (1963) has assumed, not unreasonably, that the collection is that of the Rev. John Bateman (fl. 1665-1700), long known for his list of plants growing round Faversham, in Kent, one of the earliest local Floras on record. Further evidence has now come to light which indicates that this is not, after all, the case and that there were two almost contemporaneous botanists bearing this relatively uncommon name.

The little that can be established about the Rev. John Bateman provides no evidence that he acquired any medical qualifications (the references to him in the literature of the period are all to "Mr." Bateman) or that he botanised in the immediate vicinity of London, which the appearance of Samuel Doody's name against some of the specimens could perhaps be taken to imply. There was, however, a John Bateman who matriculated at University College, Oxford, in 1663 and gained a doctorate in medicine in 1682; he subsequently became President of the College of Physicians in 1716-18, finally dying in 1728 (Foster, 1891). One of his obituaries (Boyer *et al.,* 1728) mentions that he was Physician to King Charles II. Thomas Hearne, the antiquary, recorded (Doble, 1885) that he "was always reckon'd an excellent scholar, and well vers'd in physick (in which he was Dr.). After ye taking of his degree he practis'd in London for several years, and liv'd in very good reputation. Upon ye death of Dr. Lydal, Warden of Merton, he was one of ye three chosen by ye College"—but he failed to secure election. A brother of his, Thomas Bateman, "son of John, of Wakefield, Yorks." (Foster, 1891), was a Fellow of University College; he died in 1690, according to Hearne from a fall from his horse and very much lamented by the whole University. It was common for physicians at that time to form reference collections of simples, and although there is apparently no record of Dr. Bateman as a botanist in the literature the identification of the hortus siccus as his seems inescapable.

Of the Rev. John Bateman, the Kent botanist, "we know little" (Jackson, 1899), but there is nevertheless considerably more about him in the literature than has previously been brought to light.

The son of Laurence Bateman, of Sittingbourne, he matriculated at University College, Oxford, in May, 1683, aged 18 (so born 1664/5), graduating B.A. in 1687 and M.A. in 1690 (Foster, 1891). The fact that he was one of the four Gunsley Scholars at University College (Nichols, 1817, p. 295)—entitling him to a room in College and £15 per annum—indicates that, in accordance with the terms of this special benefaction, he was educated at either Rochester or Maidstone Grammar School. He was a contemporary at University College with the famous Dr. Richard Richardson, the Yorkshire naturalist, and evidently kept in touch with him in later years (cf. Nichols, 1817, p. 809; Turner, 1835, p. 142). After going down he lived for some years in Kent and it is to these years that the list of Faversham plants is attributed, no doubt correctly, by Jacob (1777). Hearne, writing in April, 1706, speaks of him as having a cure near Canterbury, adding that "Mr. Bateman is a man much inclin'd to Botanny, and w^t spare time he has from his Divinity Studies he lays out y^t way, much to his Commendation and Credit" (Doble, 1885).

Shortly before June, 1716, he was made curate to Dr. Charlett, Master of University College, at Hambleden, in Buckinghamshire. Hearne, in noting the appointment, describes him as "an old scholar of University College and a weak man". Two months later he was preaching at St. Mary's Church, Oxford, and Hearne's reference is again slighting: "This Gentleman is a Dabler in Botanny and some other things. He is a man of very ordinary parts" (Rannie, 1901). But Bateman was also a collector of ancient manuscripts at this time and it is possible that Hearne wrote in this way out of jealousy.

In the same year Dr. Charlett, in a letter to Dr. Richardson (Nichols, 1817, p. 295), mentions that Bateman has found a new kind of water-mouse in Sussex—indicating that his interests extended to zoology. Some two years later, in a letter to Ralph Thoresby (Nichols, 1817, p. 809), this same "curious Botanist" is further credited with the discovery on a moor near Marlow of "two springs; the one Chalybeate, resembling Tunbridge; the other of Allom, like to Epsom".

In June, 1724, Hearne again encountered Bateman in Oxford and was interested to learn from him that a book had lately been published on the antiquities of the Isle of Thanet.

His death took place only a few months later. The year in which this occurred is confidently given as 1724 by Rendle (1931), but his source for this fact is unknown: the date is inserted in his manuscript (now in the library of the Department of Botany, British Museum (Natural History)) without any note or comment. It would appear, however, to be correct, for Hasted (1800) records that Bateman died at the age of 80, his estate of Hauts Place, in the parishes of Petham and Waltham, S.S.W. of Canterbury (a long way from Faversham), which had been in the Bateman family since the early seventeenth century, passing at his death to his niece, a Mrs. Philpot.

Although he was still in residence at Oxford up to the time of his death, he appears to have spent at least part of the summer in these later years on his property in Kent. This is evidenced by a remark by Jacob (1777), who was born in 1710, that "in the early part of Life" he made several botanical excursions with Bateman "hereabouts"—by inference, about Faversham. However, in the preface to another of his books, Jacob (1774) mentions that he moved to Faversham from his native city, Canterbury, "nearly forty years ago", i.e. shortly after 1734, so that at the period referred to he must have been merely a visitor to the town. Bateman's presence in Faversham is also somewhat mysterious—certainly at no time was he one of the vicars there—and one can only suppose that he was the owner of further property in that neighbourhood in addition to the Hauts Place estate. It is particularly regretable that no more is known about the circumstances of their meeting and friendship, for Jacob, it is now clear, was making these botanical excursions at the surprisingly early age (even for those days) of—at most—fourteen, his interest in botany perhaps aroused by the start of his apprenticeship in physic. It is, at any rate, a pleasant addition to our knowledge of the history of local Floras that one of the earliest of all should thus have had its genesis in the instruction in the subject in the field given to a mere boy by a veteran of over seventy.

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AN EXPERIMENT WITH EPILOBIUM ANGUSTIFOLIUM

By M. J. Harvey
(Biology Department, Dalhousie University, Halifax, Canada)

Introduction

Before the middle of the last century *Epilobium angustifolium* L. was a localized plant in Britain. The known localities in many counties were sufficiently few to merit their being listed in detail, e.g. Baker and Tate (1868) list only 16 localities for the whole of Northumberland and Durham (vice-counties 66, 67, 68) and remark that it is found "on banks of nearly all the hill streams". Since this is a particularly conspicuous plant when in flower this paucity of written records reflected a real rarity. Present day localities in the same vice-counties run into many thousands, the majority at lower altitudes than those mentioned by Baker and Tate. This situation is reflected throughout lowland Britain to-day where *E. angustifolium* is an aggressive weed wherever it can find disturbed ground. Indeed it achieved a certain fame for a time by covering up many of the ruined buildings created by the "blitz." In the *Atlas of the British Flora* (Perring and Walters, 1962) it is shown to occur in almost every ten kilometre square in England, Wales, and Scotland south of the Great Glen. The only sparsely colonized regions are Ireland and north of the Great Glen.

The explosive spread of a species in this manner is, of course, very interesting and many questions can be posed. Outside Britain *E. angustifolium* is widely distributed across Eurasia and North America where many varieties have been named. The idea that immediately came to mind was that perhaps the new widespread 'weedy' plant was an introduction from outside the British Isles and differed in some way from the 'native' plant. Accordingly, an attempt was made to test whether there were differences between these two groups.

Experimental Work

During 1960 plants of *E. angustifolium* were obtained from a variety of habitats and grown in pots in the experimental garden at Durham University. The lowland, aggressive form grew abundantly around Little High Wood at the rear of the University grounds. This was used as the weedy representative. An anther squash of it showed that the pollen mother cells had $n=18$ rather small bivalent chromosomes, which is the same number as has previously been reported: Löve and Löve (1956) for Iceland; Mulligan (1957) for Canada; and Sorsa (1963) for Finland. The doubled number, $2n=72$, an octoploid, has been reported from central and northwest Europe (Löve and Löve 1961) and Canada but not so far from Britain.

The 'original' native form was somewhat more difficult to get but specimens were obtained from two hill localities which are extremely isolated from the lowland populations. These localities are: the gorge on Force Burn, Moorhouse Nature Reserve, Westmorland, and Craig Rennet, Corrie Fee, Glen Clova, Angus, Scotland. In both it grows on a cliff where it obtains freedom from shade; both localities are several miles from the nearest weedy population. There seemed to be no doubt that these represented the plant and the habitat which characterised the species before its irruption.

All plants were grown in pots which were rather small and so restricted the size to which they could grow. Within these cultivation limits there were no obvious phenotypic differences between the plants. In particular the leaves and flowers did not differ from plant to plant.

For cross-pollination the plants were kept in a greenhouse screened against insects, the anthers were removed from a number of unopened flower buds and the flowers left until the stigmas became receptive. Several flowers were left unpollinated and these set no seed. The following cross-pollinations were carried out (female parent first).

Durham × Moorhouse
Durham × Clova
Moorhouse × Clova

All the pollinated flowers set abundant seed which germinated well and a few seedlings from each cross were grown to flowering. Pollen of the hybrids was examined in aceto-carmine stain and was found to be of a uniformly good appearance with no misshapen grains apparent.

Discussion

The experiment has been planned on the assumption that there were genetic differences betwen the parental plants and that these differences would be revealed by some degree of malformation of the pollen grains in the hybrids. There was no such malformation and hence the differences between the parents, if any, are at a level at which no irregularities take place during meiosis in the hybrids. It can be deduced that all three plants had the same chromosome number although only one was actually counted. Apomixis might have caused these results but it seems unlikely as—so far as I know—it has not been reported in *Epilobium* species whose breeding systems have been the subject of some classical research.

It is possible to hypothesise that our weedy plant may possess some hybrid vigour resulting from the combining of the genes of several inbred and long-isolated cliff populations. It is not easy produce any reason why the spread was so long delayed. The conditions required: high light availability and disturbed ground, have been present for many centuries. Possibly there was some initial inertia in the spread and meeting of the original isolated and presumably inbred populations, but that once sufficient numbers of these had met and combined their gene pools there resulted the observed population explosion. Also the dates of the railway age, roughly 1840-70, coincide with the start of the spread. The seeds, small and plumed, are preadapted for distribution in the rush of air produced by a train, and the track and embankments provide the loose and open conditions needed by *E. angustifolium.*

Conclusion

The idea that our weedy *E. angustifolium* is an introduction from Eurasia or North America is neither supported nor disproved. There is, however, no need to suppose an introduction since morphologically and genetically no differences were found between the 'weedy' and the 'native' plants.

Acknowledgments

Thanks are due to Professor D. H. Valentine for the cultivation facilities, to Alan Eddy for showing me the Moorhouse population and to the D.S.I.R. for the studentship during the tenure of which this work was carried out.

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SHORT NOTES

SIR WILLIAM HOOKER'S VASCULUM

In 1821, at the end of his first year's course as Professor of Botany at the University of Glasgow, Sir William Hooker's students presented him with a handsome silver vasculum, chased with a design based on the moss *Hookeria lucens* (J. D. Hooker, 1902, *Ann. Bot.*, **16**). Realising that this vasculum, if still extant, would antedate by a few years that of Charles Darwin, now in the possession of the Linnean Society and hitherto believed to be the oldest one still surviving, I recently made enquiries at Kew to see if by any chance it had found its way into their collection of Hookeriana. It had not, but by a fortunate coincidence Miss Mea Allen, who is preparing a biography of the two Hookers, was working at Kew at the time of my enquiry and through her good offices and those of the Director and Keeper it has proved possible to establish the present location of the vasculum without difficulty.

It turns out to be in the possession of Col. C. E. P. Hooker, Sir William's great-grandson, at his home in Nenagh, Co. Tipperary, where it is in daily use as a biscuit-box—as it is believed to have been for the past 145 years. It is valued as a family heirloom and there is consequently no risk whatsoever of this most interesting relic being discarded (as must have happened to so much ancient botanical equipment) as a useless object of no obvious worth or purpose. It is hoped that it may prove possible to exhibit it at a meeting of the Society at some future date.—D. E. ALLEN.

PRESERVATION OF LETTERS

It is not perhaps sufficiently appreciated that the correspondence of present-day botanists has, in many cases, considerable potential value for future historians and biographers. Not only letters relating to scientific administration and policy, but all types, down to the most chatty and seemingly ephemeral, can prove of the greatest possible interest in these respects. It is therefore important that members should give some thought to this, before permitting collections to be destroyed irreparably. Should there be doubts about the value of any particular series or letters, the Society's Hon. Archivist (c/o Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7) will be happy to advise.

Correspondence may be passed in the first instance to the Society, which will be glad to retain material judged to have a particular bearing on its own history and activities. All other material will be offered to such official repositories as seem most appropriate. Should there be hesitation about making publicly available correspondence of or about persons still living, it should be borne in mind that donations of this nature can always incorporate conditions regarding disclosure, including specific time-intervals to be observed before documents are to be consultable. In the interests of scholarship, however, conditions of this type should not be imposed without careful thought and preferably not unless considered quite essential.

It is especially important that correspondence and other documents arising from the preparation of county Floras should be preserved and deposited, ideally, in a local museum or, better still, in the relevant county record office, which will normally have staff specially trained in the care and cataloguing of manuscript material. The choice of a county record office has the added advantage that, in most cases, all new accessions are notified to the National Register of Archives, whose very extensive (and far too little known) indexes to the local manuscript collections of England and Wales are freely consultable—Mondays-Thursdays, 9.30 to 5.30; Fridays, 9.30 to 5.15—at the offices of the Royal Commission on Historical Manuscripts, Quality House, Quality Court, Chancery Lane, London, W.C.2. These indexes already include a considerable amount of data relating to botany, and substantial additions are currently accruing from the nation-wide survey on scientific manuscripts recently organised by the Standing Conference of National and University Libraries.—D. E. ALLEN.

PLANT NOTES

15/8. Asplenium septentrionale (L.) Hoffm. On 1st July 1965 a party from the Botany Department of the University of Glasgow visited Roundstone, Connemara, and while crossing the range of hills of which Errisbeg is the highest point, H. A. McAllister discovered a colony of 15-20 plants of the Forked Spleenwort. The plants were growing in the narrow crevices of otherwise bare gneiss rocks at an elevation of about 500 feet.

The only other Irish record of *Asplenium septentrionale* is that noted by Praeger (1912, *Irish Naturalist,* **1912**, 154) for Co. Down, where the plant grew in a situation where there was little likelihood of its being native.

This discovery also adds a new native species, not only to the Irish flora, but also to the already impressive list of rarities to be found in the vicinity of Roundstone.—A. McG. Stirling.

653/1. Typha latifolia L. There are no records for this species in the Isle of Man before about 1890, although it is now fairly widespread. So conspicuous a plant can hardly have been overlooked by earlier workers, and the inference must be that it is a relatively recent arrival. As several of its stations are on or close to old estates, the likeliest explanation is that all the wild colonies are derived from plants brought over as water-garden ornamentals. In the light of this the status of the species in many parts of the west and north of the British Isles perhaps merits more critical scrutiny.

The Manx plant often has a rather strikingly slender appearance. No biometric study has been made and it may well be that this is merely part of the natural variation to be expected within this species. On the other hand, the possibility of introgression should not be ignored, particularly in view of the demonstration of its occurrence between this species and *T. angustifolia* L. in the United States and Canada by Fassett & Calhoun (1952, *Evolution,* **6**, 367-379). So far as can be discovered, no one has yet checked the British populations of these species to see if the same situation obtains over here. As plants utilised in horticulture so often turn out to be introgressive forms, it is not impossible that a good deal of the *T. latifolia* grown as an ornamental may be infected to a greater or lesser extent by *T. angustifolia.* Should this prove to be the case, it might afford a valuable means of distinguishing the truly native populations from those derived from ornamental stocks.—D. E. Allen.

PLANT RECORDS

Compiled by E. C. WALLACE

"Plant Records" are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1965.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.* Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§3/2. ISOETES ECHINOSPORA Durieu. *47, Montg.; Llyn Mawr, B. SEDDON, comm. NAT. MUS. WALES.

§4/4. EQUISETUM VARIEGATUM Schleich. ex. Weber & Mohr. *87, W. Perth; calcareous flushes, 1,800 ft., hills north of Balquhidder, A. McG. STIRLING.

§4/8. EQUISETUM PRATENSE Ehrh. *106,, E. Ross; wood by river Glass near Evanton, U. K. DUNCAN, conf. A. C. JERMY.

§7/2. HYMENOPHYLLUM WILSONII Hook. *106, E. Ross; Allt nan Caeraeh, Glen Glass, near Evanton, in basic sandstone stream ravine, U. K. DUNCAN.

§14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. *106, E. Ross; Ravine of the Ethie Burn, Black Isle, 1962, C.S.S.F. FIELD MEETING, comm. A. McG. STIRLING.

15/6. ASPLENIUM VIRIDE Huds. H.27, W. Mayo; Sheeffrey Hills, near Owenmore, A. McG. STIRLING & K. BECKETT.

§15/8. ASPLENIUM SEPTENTRIONALE (L.) Hoffm. ‡H.16, W. Galway; on the ridge of Errisberg, near Roundstone, c.20 plants, H. A. McAllister & Glasgow University Party (1966, *Ir. Nat. J.*, **15**, 149)*.

§16/1. CETERACH OFFICINARUM DC. ‡31, Hunts.; Elton, 1964, J. C. Rees (1965, *Ann. Rep. Oundle School N.H.S.*, **1964**, 16).

§21/2. DRYOPTERIS BORRERI Newm. ‡29, Cambs.; plantation at Chippenham, 1964, O. Vaughan (1965, *Nature in Cambs.*, **8**, 29).

§22/1. POLYSTICHUM SETIFERUM (Forsk.) Woynar. ‡29, Cambs.; plantation at Chippenham, 1964, O. Vaughan (1965, *Nature in Cambs.*, **8**, 29). 99, Dunbarton; Creinch, Loch Lomond, A. McG. STIRLING.

22/2. POLYSTICHUM ACULEATUM (L.) Roth var. CAMBRICUM (S. F. Gray) Druce. 50, Denbigh; Graig Wood, Denbigh, 1964, E. MORRIS, comm. NAT. MUS. WALES.

24/3. THELYPTERIS PHEGOPTERIS (L.) Slosson. 11, S. Hants.; Cole Bridge, Emery Down, Lyndhurst, 1951, R. P. BOWMAN.

§24/4. GYMNOCARPIUM DRYOPTERIS (L.) Newm. (*Thelypteris dryopteris* (L.) Slosson). *55 (Rutland); Manton railway station, on brickwork of platform face, three healthy plants with *Asplenium ruta-muraria, A. trichomanes* and *Dryopteris filix-mas*, K. G. MESSENGER, conf. F. H. PERRING.

§25/i. POLYPODIUM INTERJECTUM Shivas. *H.9, Clare; wall near Killinaboy: *H.27, W. Mayo; Sheeffrey Hills, near Owenmore: *H.33, Fermanagh; Knockmore Cliff, near Enniskillen, A. McG. STIRLING & K. A. BECKETT.

28/1. BOTRYCHIUM LUNARIA (L.) Sw. 14, E. Sussex; several patches in turf on summit of downs above Kingston by Lewes, F. ROSE, E. C. WALLACE, ET AL.

†34/c. CHAMAECYPARIS LAWSONIANA (Murr.) Parl. 3, S. Devon; two young trees, c.30-40 ft. high, apparently self-sown, heathland in Gidleigh Gorge, R. J. SKERRETT.

†43/3. ANEMONE APENNINA L. 85, Fife; near ruins of Bogie House, Kirkcaldy, 1963→, G. H. BALLANTYNE.

46/3. RANUNCULUS BULBOSUS L. 97, Westerness; grass bank by Stage House Inn, Glenfinnan, M. MCCALLUM WEBSTER.

46/10. RANUNCULUS AURICOMUS L. H.15, S.-E. Galway; Garryland Wood, near Gort, A. McG. STIRLING & K. A. BECKETT.

§46/18. RANUNCULUS TRIPARTITUS DC. *43, Radnor; pool on Colva Hill, 1953, Miss A. C. POWELL, det. B. SEDDON, 1965, comm. NAT. MUS. WALES.

* See Plant Notes, p. 234—**Ed.**

46/22c. RANUNCULUS PELTATUS Schrank subsp. PSEUDOFLUITANS (Syme) C. Cook. 83, Edinb.; Gogas Burn between Redhugh and Corstorphine, E. P. BEATTIE.

48/1. MYOSURUS MINIMUS L. 22, Berks.; garden weed, Salisbury Road, Hungerford, 1962, Miss C. M. FRANKUM, det. & comm. C. C. TOWNSEND.

†54/1. MAHONIA AQUIFOLIUM (Pursh) Nutt. 94, Banff; woods at Duff House, Banff, 1964, M. MCCALLUM WEBSTER.

§57/1. CERATOPHYLLUM DEMERSUM L. *68, Cheviotland; Barelees Pond, Cornhill on Tweed, Miss J. DODD.

§59/1. MECONOPSIS CAMBRICA (L.) Vig. ‡†100, Clyde Isles; established on shingle beach, Sannox, Arran, A. McG. STIRLING. For an earlier record see Lee, J. R. (1933, *Flora of the Clyde Area*, 19).—**Ed.**

†61/c. GLAUCIUM CORNICULATUM (L.) Rudolph. 83, Edinb.; several plants on railway siding, Borthwick Bank, 1964-65, E. P. BEATTIE.

65/3. CORYDALIS CLAVICULATA (L.) DC. 105, W. Ross; plentiful by main roadside, just west of bridge over river Broom, to Inverbroom Lodge, M. MCCALLUM WEBSTER.

66/7. FUMARIA DENSIFLORA DC. (*F. micrantha* Lag.). H.25, Roscommon; abundant on a disturbed roadside near Athlone, J. R. IRONSIDE WOOD, det. P. D. SELL.

†68/1. ERUCASTRUM GALLICUM (Willd.) O. E. Schulz. 26, W. Suffolk; weed of nursery garden, Herringswell, 1964, J. R. IRONSIDE WOOD.

75/1. CRAMBE MARITIMA L. 75, Ayr; shingle beach near Dunure, A. McG. STIRLING.

†76/2. RAPISTRUM RUGOSUM (L.) All. 85, Fife; harbour ridings, Kirkcaldy, 1960; waste ground, Dysart, 1963-64, G. H. BALLANTYNE (as subsp. *rugosum*).

§†80/2. CORONOPUS DIDYMUS (L.) Sm. *103, Mid Ebudes; garden weed, well established in neglected gravel paths, Glenforsa, Isle of Mull, U. K. DUNCAN.

§84/3. THLASPI PERFOLIATUM L. *55 (Rutland); Luffenham railway station goods yard, on edge of ballast and embankment, K. G. MESSENGER, conf. T. G. TUTIN.

†91/s. ALYSSUM SAXATILE L. 88, Mid Perth; established on shingle of river Garry, north of Alt Girnaig, Killicrankie, M. MCCALLUM WEBSTER.

94/3. DRABA INCANA L. 87, W. Perth; limestone rocks, 1,800 ft., hills north of Balquhidder, A. McG. STIRLING.

§94/4. DRABA MURALIS L. ‡46, Cardigan; garden weed, Glandyfi Castle, W. M. Condry (1965, *Nature in Wales*, **9**, 145).

99/1. CARDAMINOPSIS PETRAEA (L.) Hiit. 98, Argyll; hills south of Kilbridemore, Glendaruel, 1963, A. McG. STIRLING.

102/2×1. NASTURTIUM MICROPHYLLUM (Boenn.) Reichb. × N. OFFICINALE R. Br. (*Rorippa microphylla* (Boenn.) Hyland. × *R. nasturtium-aquaticum* (L.) Hayek). 45, Pemb.; in a small stream, St. Brides, T. A. W. DAVIS, conf. B. SEDDON.

§102/3. RORIPPA SYLVESTRIS (L.) Bess. *46, Card.; Llechryd Bridge, 1962, A. O. CHATER, comm. NAT. MUS. WALES. *95, Elgin; garden weed, Milton Brodie, M. MCCALLUM WEBSTER.

105/1. ERYSIMUM CHEIRANTHOIDES L. H.7, S. Tipperary; arable field near Hymenstown House, near Cahir, M. MCCALLUM WEBSTER.

113/1. VIOLA ODORATA L. †95, Elgin; small wood by the Muckle Burn, west of Barley Mill, Brodie, M. MCCALLUM WEBSTER.

123/12. SILENE NOCTIFLORA L. 57, Derby; cornfield weed near Markland Grips, Cresswell, 1959, J. S. BULL.

133/3. STELLARIA PALLIDA (Dumort.) Piré. 82, Haddington; dunes at Gullane, a large colony, E. P. BEATTIE & V. GORDON.

143/1. SPERGULARIA RUBRA (L.) J. & C. Presl. 105, W. Ross; new sown verge to main road west of Loch Broom, M. MCCALLUM WEBSTER.

143/4. SPERGULARIA MEDIA (L.) C. Presl. 105, W. Ross; salt marsh at head of Loch Broom, 1965, M. MCCALLUM WEBSTER.

§146/1. HERNIARIA GLABRA L. *†19, N. Essex; long disused railway line, Thaxted, 1963, J. L. FIELDING & J. R. IRONSIDE WOOD, det. J. E. LOUSLEY. *†69, Westmorland; disused railway track east of Kirby Stephen, Miss N. E. LANGLEY, det. and comm. C. C. TOWNSEND.

148/1. SCLERANTHUS ANNUUS L. 105, W. Ross; new sown verge to main road west of Lochbroom, M. MCCALLUM WEBSTER (as subsp. *annuus*).

§156/1. ATRIPLEX LITTORALIS L. *45, Pemb.; at least 50 plants on the drift line of a high spring tide on shingle, Dale, T. A. W. DAVIS, conf. B. SEDDON.

†161/1. PHYTOLACCA AMERICANA L. 8, S. Wilts.; rubbish-tip, Salisbury, Miss W. F. BUCKLE, det. B. T. STYLES.

163/4. MALVA NEGLECTA Wallr. H.7, S. Tipperary; farm yard, Bullydriehid House, Cahir, M. MCCALLUM WEBSTER.

†165/A. ABUTILON THEOPHRASTI Med. 19, N. Essex; Colchester, 1962, C. E. OWEN, det. and comm. C. C. TOWNSEND.

†168/3. GERANIUM ENDRESSII Gay. H.14, Leix; a strong stand by the roadside c. 2 miles west of Abbeyleix, E. BOOTH; in several places in the district, M. MCCALLUM WEBSTER.

§†191/3. **Melilotus alba** Medic. *84, Linlithgow; Carriden, several plants on waste ground, E. P. **Beattie**

192/11. **Trifolium scabrum** L. 32, Northants; acid grassland, Bonemill's Hollow, Wittering, 1964, K. G. **Messenger** & J. R. **Ironside Wood.**

200/1. **Astragalus danicus** Retz. 88, Mid Perth; grassy bank on north side of Alt Girnaig at its entrance to river Garry, Killiecrankie, M. **McCallum Webster.**

200/3. **Astragalus glycyphyllos** L. 88, Mid Perth; south bank of Alt Girnaig at its entrance to river Garry, Killiecrankie, M. **McCallum Webster.**

†206/5. **Vicia tenuifolia** Roth. 85, Fife; Burntisland dockyard, 1961→, G. H. **Ballantyne**, conf. J. E. **Lousley.**

206/16. **Vicia lathyroides** L. The locality at Crinan Ferry North, given as v.c. 101 in *Proc. bot. Soc. Br. Isl.*, **6**, 130 (1965), is in v.c. 98, Argyll.

†211/8. **Rubus spectabilis** Pursh. 85, Fife; Raith, by Kirkcaldy, very well established, 1960→, G. H. **Ballantyne.**

§212/6. **Potentilla argentea** L. *32, Northants; acid grassland, Bonemill's Hollow, Wittering, 1964, K. G. **Messenger** & J. R. **Ironside Wood.**

§212/12. **Potentilla crantzii** (Crantz) G. Beck ex Fritsch. ‡87, W. Perth; limestone rocks, hills north of Balquhidder, A. McG. **Stirling.** For an earlier record see Lee, J. R. (1933, *Flora of the Clyde Area*, 125).—**Ed.**

217/1. **Dryas octopetala** L. 98, Argyll; hills south of Kilbridemore, Glendaruel, 1963; Coire Mhorair, Kinlochleven, A. McG. **Stirling.**

†220/1. **Alchemilla tytthantha** Juz. 86, Stirling; in abundance on a railway bank, Milton of Campsie, D. **McClintock**, R. **Mackechnie** & A. McG. **Stirling**, det. S. M. **Walters.**

225/9. × 12. **Rosa dumalis** Bechst. × R. **sherardii** Davies. 103, Mid Ebudes; Carsaig Bay, Isle of Mull, C.S.S.F. **Field Meeting**, det. R. **Melville**, as *R. sherardii* × *R. afzeliana*, comm. U. K. **Duncan.**

§†227/4. **Cotoneaster microphyllus** Wall. ex Lindl. *83, Edinb.; abundant in a disused quarry near Ratho, E. P. **Beattie.**

†227/5. **Cotoneaster frigidus** Wall. ex Lindl. 82, Haddington; roadside between Haddington and East Linton, one tree: 83, Edinb.; disused quarry, Corstorphine Hill, several young trees, E. P. **Beattie.**

†231/1. **Amelanchier laevis** Wieg. (*A. confusa* auct.). 69, Westmorland; peat mosses near Broughton in Furness, 1962, K. R. **Burgess**, det. and comm. C. C. **Townsend.**

§†235/11. **Sedum reflexum** L. *83, Edinb.; Balerno, a few plants on a wall, E. P. **Beattie.**

†240/1. TELLIMA GRANDIFLORA (Pursh) Dougl. ex Lindl. 85, Fife; established in woodland at Ravenscraig, Kirkcaldy, G. H. BALLANTYNE, conf. at ROY. BOT. GARD., KEW.

†242/P. PELTIPHYLLUM PELTATUM (Torr.) Engler. 83, Edinb.; abundant at Carbery, E. P. BEATTIE.

§249/1. LYTHRUM SALICARIA L. *83, Edinb.; several plants at Carbery, E. P. BEATTIE.

§249/2. LYTHRUM HYSSOPIFOLIA L. *19, N. Essex; cornfield weed in the Chelmer valley, Barnston, 1964, J. R. IRONSIDE WOOD.

§254/4. EPILOBIUM LANCEOLATUM Seb. & Mauri. *11, S. Hants.; disused gravel pit, Shortash, Rumsey, R. P. BOWMAN.

§†254/13. EPILOBIUM NERTERIOIDES Cunn. *H.6, Waterford; Tower Hill, R. HARTAS-JACKSON, comm. M. MCCALLUM WEBSTER. *H.37, Armagh; garden pest, Tynan Abbey, M. MCCALLUM WEBSTER.

§†256/2. OENOTHERA ERYTHROSEPALA Borbás. *83, Edinb.; Levenhall, several plants on reclaimed ground, E. P. BEATTIE.

§259/4. MYRIOPHYLLUM ALTERNIFLORUM DC. 45, Pemb.; in an old claypit on Trefeiddan Moor, St. David's, 1964, T. A. W. Davis (1964, *Nature in Wales*, **9**, 71). *47, Montg.; Llyn Du, Meifod, B. SEDDON, comm. NAT. MUS. WALES.

†265/2. THELYCRANIA SERICEA (L.) Dandy. 83, Edinb.; established at Dreghorn, Edinburgh: 84, Linlithgow; established in Hopetown Estate, South Queensferry, and elsewhere, E. P. BEATTIE. 95, Elgin; a strong stand by roadside just north of Carron, M. MCCALLUM WEBSTER.

283/2. BUPLEURUM ROTUNDIFOLIUM L. 12, N. Hants; near Monkwood, Ropley, C. W. MUSGRAVE BURTON, conf. E. C. WALLACE.

†308/1. LEVISTICUM OFFICINALE Koch. 85, Fife; waste ground, Kinghorn, a single plant, 1963→, G. H. BALLANTYNE.

§†311/2. HERACLEUM MANTEGAZZIANUM Somm. & Levier. *32, Northants.; established by streamside, Southwick, J. S. REES. *105, W. Ross; both sides of private road to Inverbroom Lodge, originally planted, M. MCCALLUM WEBSTER.

320/1(3). POLYGONUM RURIVAGUM Jord. ex Bor. 19, N. Essex; cornfield weed near Felstead, J. R. IRONSIDE WOOD, det. B. T. STYLES.

†320/7. POLYGONUM AMPLEXICAULE D. Don. 85, Fife; Raith, by Kirkcaldy, 1962→, G. H. BALLANTYNE, conf. at ROY. BOT. GARD., KEW.

†320/20. POLYGONUM SACHALINENSE F. Schmidt. 32, Northants.; abundantly established by streamside, Southwick, J. S. REES. 45, Pemb.; roadside at Croes-fihangel, Crymmych, 1964, T. A. W. Davis (1964, *Nature in Wales*, **9**, 71).

†320/21. POLYGONUM POLYSTACHYUM Wall. ex Meisn. 83, Edinb.; a few colonies at Carbery, E. P. BEATTIE.

†327/1. SOLEIROLIA SOLEIROLII (Req.) Dandy (*Helxine soleirolii* Req.). 28, W. Norf.; established on Spooner Row railway station: 32, Northants.; established between paving stones, Oundle, J. S. REES.

§343/17. SALIX LAPPONUM L. 87, W. Perth; hills north of Balquhidder, A McG. STIRLING. *112, Zetland; small island in freshwater lake, Moosa Water, Northmavine, c.450 ft., 1959, W. SCOTT, det. K. H. RECHINGER.

343/19. SALIX ARBUSCULA L. 87, W. Perth; limestone rocks, hills north of Balquhidder, A. McG. STIRLING.

†345/2. RHODODENDRON LUTEUM Sweet. 3, S. Devon; Chagford; regenerating abundantly in woods in Gidleigh Gorge, North Teign; also rare in Warcleave, R. J. SKERRETT.

†351/1. GAULTHERIA SHALLON Pursh. 3, S. Devon; hedgerow of a byroad in Marwood Parish, Miss A. N. RICHARDS, det. & comm. C. C. TOWNSEND.

358/1. VACCINIUM VITIS-IDAEA L. 3, S. Devon; Dartmoor; one bush, Cut Combe Water, 1958, R. J. SKERRETT.

§358/2. VACCINIUM MYRTILLUS L. ‡31, Hunts.; Holme Wood, 1945, I. Hepburn (1965, *Rep. Oundle Sch. nat. Hist. Soc.*, **1964**, 16).

§†358/6. VACCINIUM MACROCARPON Ait. ‡100, Clyde Isles; well established on the island of Arran in the Firth of Clyde, A. H. Sommerville (1965, *Trans. Proc. Bot. Soc. Edinb.*, **40**, 129).

§359/3b. PYROLA ROTUNDIFOLIA L. subsp. MARITIMA (Kenyon) E. F. Warb. *44, Carm.; Towyn Burrows, Pembrey, July, 1964, D. DAVIES, ET AL.; Sept., 1964, Mrs. I. M. VAUGHAN & R. F. MAY, comm. NAT. MUS. WALES.

§362/1(1). MONOTROPA HYPOPITYS L. *sensu lato*. *55, (Rutland); Ketton, rare in beech plantation, c.40 years old, 1964, R. BLACKMORE; 1965, K. G. MESSENGER.

§362/1(2). MONOTROPA HYPOPHEGEA Wallr. *44, Carm.; Crwbin, near Llangendeirne, E. GRIFFITHS, comm. NAT. MUS. WALES.

§364/2. EMPETRUM HERMAPHRODITUM Hagerup. ‡48, Mer.; in some quantity in acidic mountain grassland at c.1,900 ft. in the eastern part of the Cader Idris range, 1963, D. A. Ratcliffe (1965, *Nature in Wales*, **9**, 145).

368/1. HOTTONIA PALUSTRIS L. 58, Chester; abundant in small pond, Wilmslow, G. M'KAY.

†370/5. LYSIMACHIA PUNCTATA L. 32, Northants; naturalised on stream banks near Southwick, 1965, J. S. REES.

§382/5. CENTAURIUM CAPITATUM (Willd.) Borbás. ‡45, Pemb.; on a vacant building plot, Johnston, 1964, J. W. Donovan, conf. B. Seddon (1964, *Nature in Wales*, **9**, 71).

†394/1. Trachystemon orientalis (L.) G. Don. 33, E. Glos.; on the main Broadway-Stow-on-the-Wold road (A424) near the Cross Hands, 1963, Mrs. G. D. H. **Wainwright**, det. and comm. C. C. **Townsend**. 90, Forfar; established in small quantity by stream, Lintrose, Kettins, U. K. **Duncan**. 94, Banff; woodland near the old mausoleum, Duff House Woods, Banff, 1963, H. E. **Wilson**, comm. M. **McCallum Webster**.

§399/1. Pulmonaria longifolia (Bast.) Bor. *†83, Edinb.; a few small colonies at Carbery, E. P. **Beattie**.

§†399/2. Pulmonaria officinalis L. ‡29, Cambs.; well established in the grounds of Bottisham Park, 1963 (1964, *Nature in Cambs.*, **7**, 38).

†403/B. Brunnera macrophylla (Adam) I. M. Johnston. 85, Fife; established at Dunnikier, Kirkcaldy, and elsewhere as at West Wemyss, as a garden outcast, G. H. **Ballantyne**.

§406/4. Calystegia soldanella (L.) R. Br. *85, Fife; east end of Dumbarnie Links, near Elie, 1962→, G. H. **Ballantyne**.

407/1. Cuscuta europaea L. 32, Northants.; on nettles near Apethorpe; not seen in the county for many years, B. W. H. **Coulson** & J. **Rees**.

§†420/2. Linaria purpurea (L.) Mill. *49, Caerns.; field near Siliwen Road, Bangor, W. **Elfyn Hughes**, comm. **Nat. Mus. Wales**.

†423/2. Cymbalaria pallida (Ten.) Wettst. 3, S. Devon; a small clump established on Chagford Bridge for at least ten years, R. J. **Skerrett**.

424/3. Scrophularia umbrosa Dumort. 57, Derby; Pleasley Vale, J. S. **Bull**.

430/6. Veronica montana L. 32, Northants.; two large patches in Oundle Wood. This rather surprising record (Druce, G. C., *Flora of Northamptonshire* (1930), doubts the existence of the plant in the county) was confirmed by B. W. H. Coulson (1965, *Rep. Oundle Sch. nat. Hist. Soc.*, **1964**, 14).

§430/10. Veronica fruticans Jacq. *87, W. Perth; hills north of Balquhidder, A. McG. **Stirling**.

435/1(17). Euphrasia borealis Wettst. 111, Orkney; calcareous dunes, Aiker Ness, Mainland, U. K. **Duncan**, det. P. D. **Sell** & P. F. **Yeo** (as var. *zetlandica* Pugsl.).

441/3. Pinguicula vulgaris L. 12, N. Hants.; rough, damp pasture, Tichborne Common, R. A. **Boniface** & E. C. **Wallace**.

§445/6×7. Mentha niliaca Juss. ex Jacq. var. alopecuroides (Huds.) Briq. ‡4, N. Devon; Brendon, A. N. Richards, det. at British Museum (Nat. Hist.) (1965, *Rep. Trans. Devon Ass. Advemt. Sci.*, **97**, 112).

§462/3. Lamium hybridum Vill. *H.6, Waterford; arable field, Bunmahon, M. **McCallum Webster**.

467/1. Glechoma hederacea L. 105, W. Ross; in shade of Alnusby river Broom, Inverbroom, M. McCallum Webster.

§470/4. Teucrium scordonia L. ‡31, Hunts.; Holme Wood, 1945, I. Hepburn (1965, *Rep. Oundle Sch. nat. Hist. Soc.*, **1964**, 16).

481/1. Sherardia arvensis L. 98, Argyll; shore, north end of Lisinvore Island, S. Macpherson.

§484/1. Cruciata laevipes Opiz (*C. chersonensis* (Willd.) Ehrend.). *52, Anglesey; railway bank near Llanfair P.G., W. Elfyn Hughes, comm. Nat. Mus. Wales.

†492/1. Leycesteria formosa Wall. H.7, S. Tipperary; well established on railway embankment east of Ballydrichid House, Cahir, M. McCallum Webster.

§502/1. Bidens cernua L. 45, Pemb.; in a permanent pond, Pointz Castle, Brawdy, T. A. W. Davis. *68, Cheviotland; Bareless Pond, Cornhill on Tweed, Miss I. Dodd.

506/2×1. Senecio × ostenfeldii Druce. 90, Forfar; east end of Rescobie Loch, U. K. Duncan, conf. N. M. Pritchard.

506/4×7. Senecio × londinensis Lousley. 83, Edinb.; several plants, railway siding, Borthwick Bank, E. P. Beattie.

§†509/3. Petasites japonicus (Sieb. & Zucc.) F. Schmidt. *25, E. Suffolk; riverside Layham Hadleigh, Miss R. Brownhill, comm. V. M. Leather.

†521/5. Erigeron mucronatus DC. 52, Anglesey; on a wall, Menai Bridge, F. Jeal.

§556/1. Sonchus palustris L. *32, Northants.; Polebrook Lake, 1952, B. W. H. Coulson; in quantity, 1965, J. S. Rees.

§†557/3. Cicerbita macrophylla (Willd.) Wallr. *15, E. Kent; St. Margaret's Bay; Martin Mill; Westbere Marshes; Capel, Kent Field Club, comm. V. P. F. Day. *48, Mer.; on the side of Bala Lake at Llanyal, 1964, Mrs M. D. G. Jones: *50, Denbigh; well established in several areas near Wrexham, Overton, Caerestyn and Rossett, 1964, A. G. Spencer: *51, Flint; Nannerch, A. G. Spencer & Miss A. Connolly: *52, Anglesey; with docks and arum under ash trees on the verge of the Pentraeth road near Haland Arms; patch about two square yards, with some ten flower stems discovered in July 1959; still survives, but is threatened by continual cutting and the dumping of rubbish, Mr. and Mrs. C. Tunnicliffe (1965, *Nature in Wales*, **9**, 148-149). *H.7, S. Tipperary; in a lane opposite Hymenstown House, Cahir, M. McCallum Webster.

§†559/2. Crepis vesicaria L. subsp. taraxacifolia (Thuill.) Thell. *68, Cheviotland; Belford, 1883, Terras herbarium (Roy. Bot. Gard. Edinb.), det. J. B. Marshall. This is the most northerly record of the occurrence of the plant in England, J. B. Marshall.

559/5. CREPIS BIENNIS L. 14, E. Sussex; chalk pit by the side of the road going to Beachy Head, plentiful, 1831, GRIFFITHS (HERB. ROY. BOT. GARD. EDINB.), det. J. B. MARSHALL. 45, Pemb.; Saundersfoot, 1928, J. ARNETT (HERB. MUS. WALES, CARDIFF); this predates the first record given for Pembroke in *Proc. bot. Soc. Br. Isl.*, **5**, 38 (1963). J. B. MARSHALL.

567/1. HYDROCHARIS MORSUS-RANAE L. 58, Chester; abundant in small pond, Wilmslow, G. McKAY.

§†571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. *21, Middx.; locally abundant in a gravel pit, West Bedfont, M. E. KENNEDY, conf. and comm. D. H. KENT.

§†593/1. LILIUM MARTAGON L. *83, Edinb.; a few plants have been established by the Water of Leith, Slateford, Edinburgh, for many years, E. P. BEATTIE.

606/1. LUZULA PILOSA (L.) Willd. H.6, Waterford; wood south of Fiddown Bridge, M. McCALLUM WEBSTER.

606/3. LUZULA SYLVATICA (Huds.) Gaudin. 29, Cambs.; Ten Wood, Stetchworth, 1964, O. Vaughan; the first Cambridgeshire record since 1932 (1965, *Nature in Cambs.*, **8**, 29).

§†607/11. ALLIUM PARADOXUM (Bieb.) G. Don. *25, E. Suffolk; grassy bank near Layham Hadleigh, Miss R. BROWNHILL, comm. V. M. LEATHER. *94, Banff; on stream bank of backwater of river Deveron, Duff House Woods, 1963, H. E. WILSON, comm. M. McCALLUM WEBSTER.

624/2. CEPHALANTHERA LONGIFOLIA (L.) Fritsch. 48, Mer.; "Arthog, Williams; above Harlech, Jones", *Rep. botl. Soc. Exch. Club Br. Isl.*, **1920**, 154. The original finder of the plant at Arthog still lives in the neighbourhood, and remembers as a boy showing a specimen to his schoolmaster who sent it for identification to Prof. J. Lloyd Williams. The finder has pointed out the spot where it was found, by the south side of the railway line at grid ref. 23/647156, one-third of a mile north-east of Arthog Station. The plant is no longer there. From the habitat, a railway embankment with what appear to be abandoned allotments where Soapwort (*Saponaria officinalis*), everlasting pea (*Lathyrus sylvestris*) and garden strawberries (*Fragaria* spp.) still grow, it was clearly an introduction—as it seems to be also in its existing localities at Aberdovy and at Eglwysfach in Cardiganshire. The Harlech locality has been lost. P. M. Benoit (1965, *Nature in Wales*, **9**, 147-148). H.27, W. Mayo; near Dooaghtry, Mrs. D. Cabot (1966, *Irish Nat. J.*, **15**, 156).

§625/3. EPIPACTIS PURPURATA Sm. ‡29, Cambs.; Hildersham Wood, 1962, J. C. Faulkner (1963, *Nature in Cambs.*, **6**, 45).

625/6. EPIPACTIS PHYLLANTHES G. E. Sm. 48, Mer.; approximately 1,500 flower stems were counted in the Morfa Dyffryn colony in July 1964—near six times as many as in the previous year. In one hollow where a single plant was first noticed in 1963 there were 40 in 1964. That *E.*

phyllanthes was not discovered until 1959 in this well botanised locality, and the astonishing increase in numbers (from 144) since, suggests that it is actually a recent immigrant (though by natural means) which is rapidly colonising the available habitat, P. M. Benoit (1965, *Nature in Wales*, **9**, 147).

625/7. EPIPACTIS ATRORUBENS (Hoffm.) Schult. 89, E. Perth; limestone rocks, west side of Glen Beag, Glen Shee, 1963, A. McG. STIRLING & A. A. SLACK.

§627/3. SPIRANTHES ROMANZOFFIANA Cham. *H.3, W. Cork; a single flowering plant in a marshy meadow, and eight flowering plants in a small bog nearby, c. 2 miles north-west of Glengarriff, Mr. and Mrs J. A. COLE, conf. P. F. HUNT.

§633/1. CORALLORHIZA TRIFIDA Chatel. ‡91, Kincardine; wet mossy patch of old birchwood not far from the ancient castle of Tilquhillie, near Banchory, with *Equisetum sylvaticum, Pyrola minor* and *Dactylorhiza purpurella,* Mrs. A. H. Sommerville (1965, *Trans. Proc. bot. Soc. Edinb.*, **40**, 129).

643/2b. DACTYLORHIZA MACULATA (L.) Soó subsp. ERICETORUM (E. F. Linton) P. F. Hunt & Summerhayes. 3, S. Devon; Chagford; the population on Padley Common includes a group with unspotted leaves, pure-white flowers, and buff pollinia, and a single plant with unspotted leaves, unspotted primrose-yellow flowers, and buff-yellow pollinia. In 1958, an individual was noted with cowslip-yellow flowers, R. J. SKERRETT.

§†646/1. ACORUS CALAMUS L. ‡50, Denbigh; common in swamp area on the enclosed side of Acton Lake—a proposed building site, so the future of the plant is doubtful, National Museum of Wales (1965, *Nature in Wales*, **9**, 148).

†648/1. LYSICHITON AMERICANUM Hult. & St. John. 1, W. Cornwall; banks of stream near the A.30, Mount Misery, 1962, Miss TAYLOR, det. & comm. C. C. TOWNSEND.

649/2b. ARUM ITALICUM Mill. subsp. NEGLECTUM (Towns.) Prime. 85, Fife; old estate at Balmuto, near Auchtertool, 1961→; almost certainly planted by J. T. Boswell Syme when he lived there during 1868-1888; they are now, however, completely naturalised: near Wemyss Castle, G. H. BALLANTYNE, conf. C. T. PRIME.

§652/3. SPARGANIUM ANGUSTIFOLIUM Michx. *47, Montg.; Lyl Byeilyn, B. SEDDON, comm. NAT. MUS. WALES.

654/3. ERIOPHORUM LATIFOLIUM Hoppe. 99, Dunbarton; calcareous flushes, Glen Luss, A. McG. STIRLING.

655/4. SCIRPUS SYLVATICUS L. 79, Selkirk; by the river Gala, Galashiels, 1964, M. MCCALLUM WEBSTER.

§663/1. Carex laevigata Sm. *47, Montg.; wooded bank by Llyn Ebyr, B. Seddon, comm. Nat. Mus. Wales.

§663/7. Carex lepidocarpa Tausch. *H.6, Waterford; ditch on hill, near Drumboroch, M. McCallum Webster.

§663/10. Carex serotina Mérat. *H.6, Waterford; ditch on hill, near Drumboroch, M. McCallum Webster.

663/12. Carex sylvatica Huds. 105, W. Ross; Inverbroom Lodge, M. McCallum Webster.

§669/3. Glyceria declinata Bréb. *105, W. Ross; marsh in meadow near Lochbroom, M. McCallum Webster.

670/4. Festuca altissima All. 24, Bucks.; near Taplow, T. B. Ryves, conf. C. E. Hubbard.

§670/10. Festuca vivipara (L.) Sm. *46, Card.; Plynlimon, at 2,000 ft., 1963, A. O. Chater, comm. Nat. Mus. Wales.

§674/2. Catapodium marinum (L.) C. E. Hubbard. *94, Banff; between Buckie and Findochty in several places, A. Soutar, comm. M. McCallum Webster.

†676/15. Poa chaixii Vill. 12, N. Hants.; wood south-east of Pardown, near Basingstoke, 1962, T. B. Ryves.

683/6. Bromus madritensis L. H.7, S. Tipperary; below walls by river at Clonmel, M. McCallum Webster.

†683/7. Bromus diandrus Roth. 85, Fife; harbour ridings, Kirkcaldy, 1962, G. H. Ballantyne, conf. J. E. Lousley.

683/14. Bromus racemosus L. H.7, S. Tipperary; meadow near Ballydavid, Cahir, M. McCallum Webster, det. A. Melderis.

685/1. Agropyron caninum (L.) Beauv. 105, W. Ross; river shingle, Inverbroom, M. McCallum Webster.

§†692/1. Avena fatua L. *H.6, Waterford; rough ground, Bunmahon, M. McCallum Webster.

†692/3. Avena strigosa Schreb. H.25, Roscommon; roadside weed near Athlone, J. R. Ironside Wood.

§702/1. Apera spica-venti (L.) Beauv. *†106, E. Ross; disused station yard, Strathpeffer, U. K. Duncan.

§709/1. Milium effusum L. *100, Clyde Isles; wooded sandstone rocks, Sannox, Arran, A. McG. Stirling.

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to D. E. Allen and E. B. Bangerter for their assistance.

SYSTEMATIC, ETC.

1. LYCOPODIUM. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Huperzia selago (L.) Bernh., *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 14-16. Cytological studies on *Huperzia selago* (L.) Bernh. (*Lycopodium selago* L.) have led the authors to revise certain species. The North American "species" *Lycopodium lucidulum* Michx. and *L. porophilum* Lloyd & Underwood are reduced to *H. selago* subsp. *lucidula* (Michx.) Löve & Löve, comb. et stat. nov. and var. *porophila* (Lloyd & Underwood) Löve & Löve, comb. nov., while the Asiatic species *Lycopodium chinense* Christ. and *L. serratum* Thunb. are reduced to *H. selago* subsp. *chinensis* (Christ.) Löve & Löve, comb. et stat. nov. and subsp. *serrata* (Thunb.) Löve & Löve, comb. et. stat. nov.—[D.H.K.]

4. EQUISETUM. Hauke, R., 1965, An analysis of a variable population of Equisetum arvense and E. × litorale, *Am. Fern J.*, **55**, 123-135.

4/9. EQUISETUM ARVENSE L. Van Ooststroom, S. J. & Reichgelt, T. J., 1965, Kiemdraii bij Equisetum arvense L., *Gorteria*, **2**, 147-148. A teratological form of *Equisetum arvense* gathered in the Netherlands in 1965 is described and figured and comparative forms are discussed.—[D.H.K.]

5→ PTEROPSIDA. Holttum, R. E., 1965, British ferns in a world perspective, *Br. Fern Gaz.*, **9**, 205-212.

5→ PTEROPSIDA. Tryon, A. F., 1965, Trichomes and paraphyses in ferns, *Taxon*, **14**, 214-217.

5→ PTEROPSIDA. Tryon, A., 1965, Paraphyses in the ferns, *Taxon*, **14**, 213-214.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Dring, M. J., 1965, The influence of shaded conditions on the fertility of bracken, *Br. Fern Gaz.*, **9**, 222-227.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Melville, D. J., 1965, Sporeling bracken on Littleworth Common, Surrey, *Br. Fern Gaz.*, **9**, 228-230.

15. ASPLENIUM. *Lovis*, J. D., Melzer, H. & Reichstein, T., 1965, Asplenium × adultiniforme hybr. nov. = diploides Asplenium trichomanes L. × A. viride Hudson, *Bauhinia*, **2**, 231-237. *Asplenium × adultiniforme*, hybr. nov. (diploid *Asplenium trichomanes* × *A. viride*) is described from Austria.—[D.H.K.]

18. ATHYRIUM. Kaye, R., 1965, Variation in Athyrium in the British Isles, *Br. Fern Gaz.*, **9**, 127-204. About eight varieties of *Athyrium filix-femina* remain to-day in Britain out of the several hundreds listed in a classification based on that used by E. J. Lowe in 1890. No extant varieties of *A. distentifolium* or *A. flexile* are known to the author.—[D.H.K.]

19. CYSTOPTERIS. Manton, I. & Reichstein, T., 1965, Die chromosomenzahlen von Cystopteris sudetica A. Br. et Milde von Berchtesgaden (Bayern), *Bauhinia*, **2**, 307-312.

19. CYSTOPTERIS. Profumo, P., 1965, "Cystopteris dickieana" Sm. in Italia, *Webbia*, **20**, 737-744. *Cystopteris fragilis* and *C. dickieana* have been much confused in Italy. A study of herbarium material has shown that the former is widespread in the country while the latter is known from Val d'Aosta and near Bolzano, northern Italy, and in Val Passiria, Sicily.—[D.H.K.]

20. WOODSIA. Vida, G., 1965, Chromosome numbers of Hungarian Woodsia species, *Acta Bot. Hung.*, **11**, 281-285. The only *Woodsia* species hitherto known in Hungary was *W. ilvensis*, a diploid with $n=41$. Recently, the author has discovered *W. alpina*, $n=$c. 82, in the Mátra mountain of northern Hungary, where it is probably a glacial relict.—[D.H.K.]

28. BOTRYCHIUM. Haeggström, C. A. & Niemi, A., 1965, Om sporerna hos Botrychium boreale Milde och B. lunaria (L.) Sw. *Memo. Soc. Fauna Flora fenn.*, **41**, 65-70. Studies on spore characters in *Botrychium boreale* and *B. lunaria* in Finland.—[D.H.K.]

30→ CONIFERAE. Fitzpatrick, H. M., 1965, Conifers. Keys to the genera and species with economic notes. Edition 2, *Sci. Proc. Roy. Dublin Soc. Sec. A*, **2** (**7**), 67-129 + 10 plates.

36. CALTHA. Weislo, H., 1965, Mieszánce eksperymentalne w rodzaju Caltha L., *Acta Biol Cracov., Ser. Bot.*, **7**, 185-189. Experimental studies on hybridisation on *Caltha* species and subspecies in Poland.—[D.H.K.]

44/1. PULSATILLA VULGARIS Mill. Gotthard, W., 1965, Die Küchenschalle (Pulsatilla vulgaris Mill.) im Ries, *Bot. Jb.*, **84**, 1-50.

46/2. RANUNCULUS REPENS L. Kunkel, G., 1964, Blütenmissbildungen bei Ranunculus repens L., *Ber. Schweiz. Bot. Ges.*, **74**, 41-44.

46/10. RANUNCULUS AURICOMUS L. Julin, E., 1965, Der Formenkries des Ranunculus auricomus L. in Schweden, 1. Diagnosen und Fundortsangaben einige Sippen aus Södermanland, *Arkiv för Bot.*, **6**, 1-108.

46/10. RANUNCULUS AURICOMUS L. Marklund, G., 1965, Der Ranunculus auricomus-Komplex in Finnland, 2. Diagnosen und Fundortslisten einiger Sippen von R. fallax (W. & Gr.) Schur, R. monophyllus Ovcz. und R. cassubicus L., *Flora Fenn.*, **4**, 1-198.

46/10. RANUNCULUS AURICOMUS L. Soó, R. von, 1964-65, Ranunculus auricomus L. emend Korsch. Artengruppe in der Flora Ungarns und der Karpaten, *Acta Bot. Hung.*, **10**, 221-237; *loc. cit.*, **11**, 395-404. A revision of the microspecies of *Ranununculus auricomus* L. *sensu lato* in Hungary and the Carpathians.—[D.H.K.]

49. AQUILEGIA. Skalińska, M., 1964, Studies in the origin of some European species of Aquilegia, *Acta Biol. Cracov., Ser. Bot.*, **7**, 1-24.

55→ NYMPHAEACEAE. Meyer, N. R., 1964, Palynological studies in Nymphaeaceae, *Bot. Zh. SSSR*, **49**, 1421-1429.

67→ CRUCIFERAE. Moggi, G., 1965, Osservazioni tassonomiche carologiche sulle Hesperideae (Cruciferae), *Webbia*, **20**, 241-273.

91. ALYSSUM. Bonnet, A. L. M., 1963, Contribution a l'étude caryologique du genre Alyssum L. (s. lat.), *Naturalia monspel.*, **15**, 41-52.

99. Cardaminopsis. Janchen, E., 1964, Die systematische Stellung der Gattung Cardaminopsis, *Phyton*, **11**, 31-33.

108/2. Sisymbrium irio L. Khoshoo, T. N., Biosystematics of Sisymbrium irio complex, 10. Probable phenotype of the BB genome, *Caryologia*, **18**, 667-670: 11. Competitive ability of the races, *loc. cit.*, **18**, 671-673.

123/7. Silene acaulis (L.) Jacq. Löve, A. & Löve, D., 1965, Taxonomic remarks on American alpine plants: Silene acaulis (L.) Jacq., *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 21-22. In Europe *Silene acaulis* is represented by subsp. *acaulis* and subsp. *exscapa* (All.) Vierh. and their varieties. The Arctic and eastern American race is described as subsp. *arctica* Löve & Löve, subsp. nov., this is replaced in the southern Rocky Mountains by subsp. *subacaulescens* (T. N. Williams) Hitchc. & Maguire, which also reaches Alaska and perhaps eastern Asia.—[D.H.K.]

123/13. Silene dioica (L.) Clairv. Gillham, M., 1965, Increase of red campion on Skomer Island, *Nature in Wales*, **9**, 136-138. A spectacular increase in *Silene dioica* on the island of Skomer, Pembrokeshire, between 1961 and 1963 is reported and discussed. In 1961 the species was extremely scarce following a setback in the dry autumn of 1959, and in 1960 appears to have been ± non-existant. By 1963 it had increased considerably and become ± dominant in parts of the island, while in 1964 it had increased even more. The sudden rise in dominance is attributed to the two cool moist summers of 1962 and 1963 which produced conditions similar to those of the more northerly and western islands where the species is always a conspicuous feature of the flora of sheltered cliffs.—[D.H.K.]

133. Stellaria. Mizushima, M., 1965, A conspectus of the genus Stellaria in Japan, *J. Jap. Bot.*, **40**, 90-96.

133. Stellaria. Sinha, R. P. & Whitehead, F. H., 1965, Meiotic studies of British populations of Stellaria media (L.) Vill., S. neglecta Weihe and S. pallida (Dumort.) Piré, *New Phytol.*, **64**, 343-354. Conflicting reports from Europe on chromosome numbers of various *Stellaria* species are discussed, and the following counts made on British material are given:—*S. media*, $n=22$; *S. neglecta*, $n=11$ and *S. pallida*, $n=11$.—[D.H.K.]

141/3. Arenaria ailiata L. Favarger, C., 1965, A striking polyploïd complex in the Alpine flora: Arenaria ciliata, *Bot. Not.*, **118**, 273-280.

149/2. Montia perfoliata (Willd.) Howell. Hansen, A. & Pedersen, A., 1965, Om Claytonia perfoliata L. i Danmark, *Flora og Fauna*, **71**, 86-87. *Montia perfoliata*, a North American species, was first recorded in Denmark as a garden escape in 1867. It is now known in about 30 localities, mostly as a weed in nurseries, and is believed to be mainly introduced as seeds accidentally imported with garden plants from other parts of Europe. [D.H.K.]

163/7. Malva verticillata L. Danert, S., 1965, Über einige infra spezifische Sippen von Malva verticillata L., *Kulturpflanze*, **13**, 715-735. A critical revision of the varieties of *Malva verticillata*, a Chinese plant, long cultivated in European gardens, and which is occasionally recorded as an escape.—[D.H.K.]

169. Erodium. Guittonneau, G., Contribution à l'étude caryosystématique du genre Erodium L'Hér., 2, *Bull. Soc. Bot. Fr.*, **112**, 25-32. Twenty

species of *Erodium* from Spain, Portugal and northern Morocco have been studied caryologically, and several new chromosome numbers are given as the result.—[E.B.B.]

170. OXALIS. Smejkal, M., 1965, K poznáni československých druhu rodu Oxalis, *Preslia*, **37**, 202-204. The species of *Oxalis* found in Czechoslovakia are reviewed and a key provided to their identification.—[D.H.K.]

170/1. OXALIS ACETOSELLA L. Vereschagina, V. A., 1965, The ecology of flowering and pollination of Oxalis acetosella, *Bot. Zh. SSSR*, **50**, 1078-1091.

171/3. IMPATIENS PARVIFLORA DC. Hughes, A. P., 1965, Plant growth and the aerial environment, 6. The apparent efficiency of conversion of light energy at different spectral compositions by Impatiens parviflora, *New Phytol.*, **64**, 48-54: 7. The growth of Impatiens parviflora in very low light intensities, *loc. cit.*, **64**, 55-64: 8. The effects of (a) blue light and (b) low temperature on Impatiens parviflora, *loc. cit.*, **64**, 323-329: 9. A synopsis of the autecology of Impatiens parviflora, *loc. cit.*, **64**, 399-413.

187/2. ULEX GALLII Planch. Frileux, P. N., 1964, A propos de la découverte de l'Ulex gallii Planchon en Seine-Maritime, *Bull. Soc. Linn. Normandie*, **5**, 125-128. The author reports, for the first time, the presence of *Ulex gallii* in the French province of Seine-Maritime. The station, located somewhat on the west of Dieppe, at the top of the cliffs, is a very interesting one. It is now the "most eastern station we know along the French coast of the Channel".—[Author's summary].

191. MELILOTUS. Kita, F., 1965, Studies on the genus Melilotus (Sweet Clover) with special reference to inter-relationship among species from a cytological point of view, *J. Fac. Agric. Hokkaido (imp.) Univ.*, **54** (**2**), 23-122.

195. LOTUS. Larsen, K. & Zertová, A., 1965, The Australian Lotus species, *Feddes Rep.*, **72**, 1-18. In Australia two indigenous species of *Lotus* occur, *L. cruentus* Court, which is only slightly variable, and *L. australis* Andr. which is very polymorphic. Both are tetraploid with $2n=28$. *L. corniculatus* is established as an introduction from Eurasia.—[D.H.K.]

195/3. LOTUS ULIGINOSUS Schkuhr (*L. pedunculatus* auct.). Zertová, A., 1964, Studie über die tschechoslowakischen Arten der Gattung Lotus L., 3. Lotus uliginosus Schkuhr, *Acta Inst. Horti. bot. Univ. Carol. Prag.*, **1963**, 80-83.

206. VICIA. Hansen, A. & Pedersen, A., 1965, Vicia villosa Roth. ssp. villosa og ssp. dasycarpa (Ten.) Cavillier i Danmark, *Flora og Fauna*, **71**, 83-90. *Vicia villosa* subsp. *villosa* was first introduced into Denmark as a fodder plant in the mid-nineteenth century, and though no longer cultivated it still occurs as a sporadic weed. *V. villosa* subsp. *dasycarpa* (Ten.) Cavillier, a rare species, first recorded in 1912, is exclusively a casual introduction, occurring usually in waste places near habitation. The characters separating the two subspecies are given.—[D.H.K.]

206/10. VICIA SYLVATICA L. Hansen, A. & Pedersen, A., 1965, Vicia silvatica L. var. condensata Druce i Danmark, *Flora og Fauna*, **71**, 87-88. A few records of *Vicia sylvatica* var. *condensata* Druce are known from Denmark. This curious variety of shingle beaches was originally described from the British Isles where it is known from the coasts around the northern part of the Irish Sea. It is at present known only from Denmark and the British Isles, and its ecology is similar to *Geranium robertianum* subsp. *maritimum, Solanum dulcamara* var. *marinum* and *Galium aparine* var. *maritimum.*—[D.H.K.]

207. LATHYRUS. Grime, J. P., 1965, The ecological significance of lime-chlorosis. An experiment with two species of Lathyrus, *New Phytol.*, **64**, 477-487. Seedlings of *Lathyrus montanus* and *L. pratensis* from a variety of habitats in England were experimentally grown on calcareous soils.

L. montanus, a calcifuge species, was extremely susceptible to lime-chlorosis, while *L. pratensis,* which is of widespread occurrence on calcareous soils in nature, was highly resistant.—[D.H.K.]

207/2. LATHYRUS NISSOLIA L. Andreas, C. H., 1965, Lathyrus nissolia L., *Gorteria,* **2**, 159-160. Studies on *Lathyrus nissolia* in the Netherlands have shown that the var. *nissolia* is native while the var. *pubescens* G. Beck is of adventive occurrence. This is in agreement with Cannon's investigations on English populations.—[D.H.K.]

208→ ROSACEAE. Pedersen, A., 1965, Rosaceeines udbredelse i Danmark, 1, *Bot. Tidsskr.*, **61**, 149-270. Studies on the distribution of the *Rosaceae* in Denmark.—[D.H.K.]

212. POTENTILLA. Borhidi, A. & Isépy, I., 1965, Taxa et combinationes novae generis Potentilla L., *Acta Bot. Hung.*, **11**, 298-302. A part revision of *Potentilla* in Hungary.—[D.H.K.]

212. POTENTILLA. Rousi, A., Biosystematic studies on the species aggregate Potentilla anserina L., *Ann. Bot. Fenn.*, **2**, 47-112. An extremely detailed account of cytotaxonomical and statistical studies on living material of *Potentilla anserina* L. agg. from 51 populations in various parts of the world. Of the material examined 33 populations were tentatively identified as *P. anserina* L. *sensu stricto,* 13 as *P. pacifica* Howell, 4 as *P. egedii* Wormsk. and one as *P. anserinoides* Raoul. The chromosome number of 44 of the plants examined was found to be $2n=28$ (tetraploid), and in 3 others $2n=42$ (hexaploid). The conclusions reached were that *P. anserinoides*, from New Zealand, should be kept up as a distinct species, but the other "species" should be reduced to subspecies of *P. anserina.* A key is provided to the identification of species and subspecies. *P. anserina* L. subsp. *anserina* occurs in temparate zones of Eurasia, North America and western South America, and has been introduced into Australia and Tasmania. *P. anserina* subsp. *egedii* (Wormsk.) Hiit. is found on Arctic and cool temperate seashores in North America from Alaska to Labrador, Greenland, north Europe, reaching the Baltic, and eastern Asia. *P. anserina* L. subsp. *pacifica* (Howell) Rousi, comb. nov., grows on the Pacific coast of Asia and the north Pacific coast of North America.—[D.H.K.]

216/1. GEUM URBANUM L. Tran Thanh Van, M., 1965, La vernalisation du Geum urbanum L. Etude experimentale de la mise à fleur chez une plante vivace en rosette exigeant le froid vernalisent pour fleurir, *Ann. Sci. Nat.* (*Bot.*), **6**, 373-593. A detailed study, illustrated by several plates of photographs, of the factors involved in the flowering of *Geum urbanum.* —[E.B.B.]

217. DRYAS. Elkington, T. T., 1965, Studies on the variation of the genus Dryas in Greenland, *Medd. om Grønl.*, **178** (**1**), 7-56.

220. ALCHEMILLA.—See 560. TARAXACUM.

226. PRUNUS. Kalkman, C., 1965, The Old World species of Prunus subgenus Laurocerasus, including those formerly referred to Pygeum, *Blumea*, **13**, 1-115. A revision of the Old World species of *Prunus* subgenus *Laurocerasus*.—[D.H.K.]

232. SORBUS. Litzler, P., 1965, Sur la prospection des Sorbiers dans la région de Dole et la découverte d'hybrides intéressants, *Bull. Soc. Hist. Nat. Doubs*, **67**, 19-25. Three hybrids are discussed: *Sorbus* × *semipinnata* (*S. aria* × *aucuparia*), *S.* × *thuringiaca* (*S. aria* × *aucuparia*) and *S.* × *confusa* (*S. aria* × *torminalis*). The first two have the same parents but *S.* × *semipinnata* is a median form between the parents while *S.* × *thuringiaca* is nearer to *S. aria*. Some notes are given on the diverse forms of *Sorbus* met within the region of Dole (Jura), and diagrams of leaf-shape are provided.—[E.B.B.]

232/2. SORBUS DOMESTICA L. Paton, C. A., 1965, The Whitty Pear, *Countryman*, **65**, 351-353. An account of *Sorbus domestica* in Worcestershire, and a history of the species in the county.—[D.H.K.]

252/1. HIPPOPHAE RHAMNOIDES L. Rousi, A., 1965, Observations on the cytology and variation of European and Asiatic populations of Hippophae rhamnoides, *Ann. Bot. Fenn.*, **2**, 1-18.

254. EPILOBIUM. Piispala, E., 1964, Epilobium adenocaulon Hausskn. and E. rubescens Rydb. in Ostfennoskandien, *Ann. Bot. Fenn.*, **1**, 36-46.

269→ UMBELLIFERAE. Hedge, I. C. & Lamond, J. M., 1964, A guide to the Turkish genera of Umbelliferae, *Notes R. Bot. Gdn. Edinb.*, **25**, 171-177. An alphabetical list of simple characters distinguishing the various genera of the *Umbelliferae* found in Turkey.—[D.H.K.]

319. EUPHORBIA. Khan, M. S., 1964, Taxonomic revision of Euphorbia in Turkey, *Notes R. Bot. Gdn. Edinb.*, **25**, 71-161. Many species of *Euphorbia* found in Britain are included in this revision of Turkish species.—[D.H.K.]

320→ POLYGONACEAE. Maekawa, F., 1964, On the phylogeny in the Polygonaceae, *J. Jap. Bot.*, **39**, 366-370.

320. POLYGONUM. Mertens, T. R. & Raven, P. H., 1965, Taxonomy of Polygonum section Polygonum (Avicularia) in North America, *Madroño*, **18**, 85-92. A revision of the North America species of *Polygonum* section *Polygonum* with descriptions and a key to their identification. Species recognised in North America are *Polygonum glabrum* Nutt., *P. prolificum* (Small) Robins, *P. oxyspermum* Meyer & Bunge ex Ledeb., *P. marinense* Mertens & Raven, sp. nov., *P. erectum* L., *P. fowleri* Robins, *P. aviculare* L. *sensu stricto*, *P. arenastrum* Jord. ex Bor. and *P. boreale* (Lange) Small. —[D.H.K.]

320. POLYGONUM. Timson, J., 1965, Germination in Polygonum, *New Phytol.*, **64**, 179-186. The results of a study of germination and seed dormancy in *Polygonum lapathifolium*, *P. persicaria*, *P. hydropiper*, *P. mite* and *P. minus* are presented. Methods of breaking this dormancy are reported and the causes of dormancy investigated.—[D.H.K.]

335. BETULA. Wyman, D., 1962, The Birches, *Arnoldia*, **22**, 17-23.

335/2. BETULA PUBESCENS Ehrh. Löve, A. & Löve, D., 1965, Taxonomic remarks on American alpine plants: Betula pubescens Ehrh., *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 20. In North America the subarctic-alpine races of *Betula pubescens* are classifiable into two subspecies:—Subsp. *minor* (Tuckerm.) Löve & Löve and subsp. *borealis* (Spach) Löve & Löve, comb. et stat. nov.—[D.H.K.]

341. QUERCUS. Georgesco, C. C. & Ciobanu, I. R., 1965, Considérations géographiques et écologiques sur les espèces de Quercus des séries Lanuginosae et Sessiliflorae de Roumanie, *Rev. Roum. Biol., Sér. Bot.*, **10**, 199-207.

344. LEDUM. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Ledum groenlandicum Oeder, *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 24-26. The western American *Ledum glandulosum* Nutt. is reduced to *L. groenlandicum* Oeder subsp. *glandulosum* (Nutt.) Löve & Löve, comb. et stat. nov.—[D.H.K.]

356/1. CALLUNA VULGARIS (L.) Hull. Kayll, A. J. & Gimingham, C. H., 1965, Vegetative regeneration of Calluna vulgaris after fire, *J. Ecol.*, **53**, 729-734.

356/1. CALLUNA VULGARIS (L.) Hull.—See 357. ERICA L.

357. ERICA. McClintock, D., 1965, Notes on British Heaths, 2. Hybrids in Britain, *Heather Soc. Year Book*, **1965**, 9-17. Notes on *Erica* × *praegeri* (*E. mackaiana* × *tetralix*), *E.* × *stuartii*, *E.* × *watsonii* (*E. ciliaris* × *tetralix*), *E.* × *williamsii* (*E. tetralix* × *vagans*), × *Ericalluna bealeana* (*Calluna vulgaris* × *Erica cinerea*) and various cultivated *Erica* hybrids in Britain.—[D.H.K.]

357/4. ERICA CINEREA L. Bannister, P., 1965, Erica cinerea L. (Biological Flora), *J. Ecol.*, **53**, 527-542.

†358/6. VACCINIUM MACROCARPON Ait. Sommerville, A. H., 1965, Vaccinium macrocarpon Ait. recorded from Arran, *Trans. Proc. bot. Soc. Edinb.*, **40**, 129. The North American species *Vaccinium macrocarpon* has been found to be well established on the island of Arran in the Firth of Clyde.—[D.H.K.]

359. PYROLA. Krísa, B., 1965, Beitrag zur Gliederung der Gattung Pyrola L. in holarktischen Gebieten, *Nov. Bot. Hort. Hort. Bot. Univ. Prag.*, **1965**, 31-35. A new arrangement is outlined for the holoarctic species of *Pyrola*.—[D.H.K.]

367. PRIMULA. Poszwińska, J., 1965, Introgression between Primula elatior (L.) Hill and Primula officinalis L.; *Acta Soc. Bot. Pol.*, **34**, 45-71. Studies on natural populations of *Primula elatior* and *P. vulgaris* in three of the Polish National Parks, and experimental hybridisation experiments between the two species. These experiments have shown that introgression occurs naturally between *P. elatior* and *P. vulgaris* in Poland.—[D.H.K.]

372/2. ANAGALLIS ARVENSIS L. Šverepová, G., 1965, Prehližiné formy Anagallis arvensis L. v ČSSR, *Preslia*, **37**, 333-334.

400. MYOSOTIS. Grau, J., 1965, Cytotaxonomische Bearbeitung der Gattung Myosotis L., 1. Atlantische-Sippen um Myosotis secunda A. Murr., *Mitt. bot. St. Samml., Münch.*, **5**, 675-688. Studies on European *Myosotis*. The correct name for *M. brevifolia* Salmon is said to be **M. stolonifera** Gay.—[D.H.K.]

404→ CONVOLVULACEAE. Lewis, W. H. & Oliver, R. L., 1965, Realignment of Calystegia and Convolvulus, *Ann. Mo. bot. Gdn.*, **52**, 217-222.

Studies on the pollen morphology of *Convolvulus* and *Calystegia* indicate that the two genera should be retained as separate entities.—[D.H.K.]

416→ SCROPHULARIACEAE. Loustauneau, M.-Th., 1965, Structure nucléaire de quelques Scrofulariacées, *Le Botaniste*, **48**, 157-235. Different types of nuclear structure have been observed in several species of *Scrophulariaceae* studied, the variations being in size, form and distribution of the chromocentres. It is concluded that the cytological groups arrived at do not conform completely with morphological classification.—[E.B.B.]

429. DIGITALIS. Percival, M. & Morgan, P., 1965, Observations on the floral biology of Digitalis species, *New Phytol.*, **64**, 1-22.

430/2. VERONICA ANAGALLIS-AQUATICA L. Combes, M. R., 1965, Contribution à l'étude de Veronica anagallis-aquatica L. Existence d'une pseudo-cléistogamie experimentale, *Rev. Gen. Bot.*, **72**, 323-330. The stem apices of seedlings of *Veronica anagallis-aquatica* L. were kept experimentally completely immersed in water. Pseudo-cleistogamous flowers were formed which fruited. Plants resulting from the germination of these seeds where, when cultivated in air, identical with those from seeds of normal aerial plants.—[E.B.B.]

432. PEDICULARIS. Tsoong, P. C. & Choong, K. T., 1965, Palynological study of Pedicularis and its relation with the taxonomic systems of the genus, *Acta Phytotax. Sin.*, **10**, 357-374.

445. MENTHA. Hylander, N., 1965, Släklet Mentha i det nordisk a floraområdet, *Bot. Not.*, **118**, 225-241. A revision of *Mentha* in Fennoscandia. Two species, *M. arvensis* and *M. aquatica* are indigenous. The main type of *M. aquatica* is common in Denmark, and occurs in the coastal districts of Norway, etc. A glabrous, sea-shore race, *M. aquatica* var. *litoralis* (Hartm.) C. A. West. occurs on parts of the Swedish east coast and also in south-west Finland. *M.×verticillata* is known from various parts of Sweden, most districts of Denmark, and the coastal districts of Norway, it is known also from two localities in Finland. This hybrid extends further north than *M. aquatica,* and often grows in the absence of its parents.

Forms of the polymorphic hybrid *M.×gentilis* have long been grown in Fennoscandia, and now occur rarely as relicts from cultivation near old habitations, or as weeds in potato fields, etc. *M. spicata* is naturalised in parts of Denmark and south Sweden, and has been recorded as a casual in northern Sweden and Norway. *M. arvensis×longifolia* (*M.×dalmatica* Tausch.) is known from numerous localities in southern Finland.

M. rotundifolia, M. longifolia×rotundifolia, M. pulegium, M.×piperita and *M. spicata* var. *crispa* (Benth.) Mansf. are mainly of casual occurrence. —[D.H.K.]

448. THYMUS. Roussine, N., 1965, A propos de Thymus serpyllum L. var. atlanticus Ball du Maroc, *Nat. monsp., Sér. Bot.*, **16**, 161-175. A revision of the Moroccan species of *Thymus*.—[D.H.K.]

457. PRUNELLA. Nelson, A. P., 1965, Taxonomic and evolutionary implications of lawn races in Prunella vulgaris (Labiatae), *Brittonia*, **17**, 160-174. Studies on 160 plants grown experimentally from naturally occurring populations of *Prunella vulgaris* from lawns in the United

States of America, France, Russia, Portugal and Romania. Both *P. vulgaris* subsp. *vulgaris* and *P. vulgaris* subsp. *lanceolata* were included in the study.—[D.H.K.]

459/7. STACHYS SYLVATICA L. Pfirsch, E., 1965, Déterminisme de la croissance plagiotropique chez les stolons épigés de Stachys sylvatica L. Mise en evidence d'un mécanisme d'autocorrélation, *Ann. Sci. Nat. (Bot.)*, **6**, 339-359. The plagiotropic action of the overground stolons of *Stachys sylvatica* is related to the action of gravity. Evidence is submitted that there is a mechanism of auto-co-relation involved which is physiological and not genetic.—[E.B.B.]

462. LAMIUM. Jones, S. B., Junr. & Jones, C. A., 1965, Status of Lamium hybridum Vill. (Labiatae), *Am. Midl. Nat.*, **74**, 503-506. *Lamium amplexicaule* and *L. purpureum* are commonly established in the United States of America as adventives from Eurasia. *L. hybridum* also occurs but is less frequent. Various American floras have treated *L. hybridum* as a hybrid between *L. amplexicaule* and *L. purpureum.* The authors attempted experimental crosses between the two latter species without success and also made a careful examination of a number of natural populations of *L. amplexicaule* and *L. purpureum* for possible hybrid plants. None were found, and the conclusion is reached that *L. hybridum* is a good species and should be retained as such.—[D.H.K.]

475. CAMPANULA. Hubac, J. M., 1965, Application de la taxonomie de Wraclaw (techniques des denddrites) à quelques populations du Campanula rotundifolia L., s.l., et utilisation de cette technique pour l'établissement des clés de détermination, *Bull. Soc. bot. Fr.*, **111**, 331-346. A technical statistical method is outlined and applied to twelve populations of *Campanula rotundifolia,* and a key is constructed to differentiate the microspecies.—[E.B.B.]

475. CAMPANULA. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Campanula dubia A. DC. and C. gieseckiana Vest, *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 29-30. On Mount Washington, New Hampshire, U.S.A., two distinct types of the *Campanula rotundifolia* complex occur—*C. dubia* A. DC. ($2n=68$) and *C. gieseckiana* Vest. subsp. *groenlandica* Böcher ($2n=34$), the latter is also common in Greenland, locally frequent in Iceland and on the Faroes. It should be searched for in Scandinavia and in the Scottish mountains.—[D.H.K.]

475. CAMPANULA. Phitos, D., 1965, Die quinquelokulären Campanula-Arten, *Öst. bot. Z.*, **112**, 450-498.

475/2. CAMPANULA TRACHELIUM L. Nordman, A. F., 1965, Upptradande av avvikande blomtyper inom en isolerad population av Campanula trachelium, *Memo. Soc. Fauna Flora fenn.*, **41**, 37-40.

483. ASPERULA. Romerio, M., 1965, Contribution à la cytotaxonomie du groupe de l'Asperula cynanchica L., *Bull. Soc. Neuchâtel. Sci. Nat.*, **88**, 65-76. Cytological studies on 22 populations of *Asperula cynanchica* L. *sensu lato. A. cristata* L. f. is a diploid ($2n=22$) from the Alpes Maritimes to the Bergamasque Alps and possessing distinct morphological differences as well as geographical and ecological preferences from *A. cynanchica* L. *sensu stricto* and should be retained as a distinct species.

A. cynanchica L. *sensu stricto* occurs as a diploid race ($2n=22$) at the foot of the Jura, Hegau, Strasburg. It has a slightly branched inflorescence. A tetraploid race ($2n=44$) occurs in the southern part of the higher Jura, Graübunden and western Jura. It has a much more branched inflorescence. These two races will be described more fully as subspecies or varieties when their ecology and geographical distribution are better known. —[E.B.B.]

484. CRUCIATA—See 485. GALIUM.

485. GALIUM. Gabriëls, J., 1965, Revisie der geslachten Galium L. en Cruciata Mill. (Rubiaceae) in België, *Bull. Jard. Bot. État Brux.*, **35**, 109-166. A revision of the genera *Galium* and *Cruciata* in Belgium with full descriptions, synonymy, keys to species, subspecies and varieties and distribution maps of various species.—[D.H.K.]

490/1. LINNAEA BOREALIS L. Fornaciari, G., 1965, La Linnaean borealis L. nel versante occidentale del parco nazionale dello stelvio, *Giorn. bot. Ital.*, **71**, 544-551. A study on the distribution of *Linnaea borealis* in Italy. —[D.H.K.]

502. BIDENS. Dress, W. J., 1965, Notes on the cultivated Compositae, 8. Thelesperma, Bidens, Coreopsis, *Baileya*, **13**, 21-42.

506. SENECIO. Drury, D. G. and Watson, L., 1965, Anatomy and the taxonomic significance of gross vegetative morphology in Senecio, *New Phytol.*, **64**, 307-318. The well-known arrangement of *Senecio* species appears to be based on inadequate data. Observations on leaf hairs, achene hairs, corolla venation, pappus structure and ovarian crystal form are presented for 45 species. A classification based on these features bears little resemblence to the conventional view of the genus but its taxonomic soundness is strikingly supported by considerations of gross leaf morphology and habitat.—[Author's summary].

512. INULA. Bauer, Z., 1965, Badania cyto-embriologiczne nad rodzajem Inula L., *Acta Biol. Cracov., Ser. Bot.*, **7**, 117-130. Cytological and embryological studies on *Inula ensifolia* L., *I. salicina* L., *I. hirta* L. and *I. britannica* L. in Poland.—[D.H.K.]

517. ANTENNARIA. Porsild, E. A., 1965, The genus Antennaria in eastern Arctic and subarctic America, *Bot. Tidsskr.*, **61**, 22-56. A revision, with descriptions and a key, of the 18 species of *Antennaria* recognized by the author in eastern Arctic and subarctic North America and Greenland. Distribution maps are provided for all the species.—[D.H.K.]

557/3. CICERBITA MACROPHYLLA (Willd.) Wallr. Benoit, P. M., 1965, Cicerbita macrophylla in Wales, *Nature in Wales*, **9**, 148-149. Summarizes recent records of this adventive species in Wales.—[D.H.K.]

560. TARAXACUM. Fürnkranz, D., 1965, Beitragë zur Cytogenetik experimenteller und naturlicher Hybriden bei Taraxacum, *Ber. Deutsch. Bot. Ges.*, **78**, 139-142.

560. TARAXACUM. Hudziok, G., 1965, Neue Arten der Gattung Taraxacum Zinn. sowie eine neue Art der Gattung Alchemilla aus der Mark Brandenburg. *Feddes Rep.*, **72**, 25-30. *Taraxacum subalpinum*, *T. flaemingense*, *T. prostratum*, *T. paucilobum* and *Alchemilla triformiloba* are described from northern Germany.—[D.H.K.]

560. TARAXACUM. Van Soest, J. L,. 1965, Taraxacum sect. Palustria, *Acta Bot. Neerl.*, **14**, 1-53. A revision of *Taraxacum* section *Palustria*, with

descriptions and a key to the indentification of the species, some of which are newly described.—[D.H.K.]

560/C. COREOPSIS. See 502. BIDENS.

563. ALISMA. Daumann, E,. 1965, Insekten-un windbestäubeg bei Alisma plantago-aquatica L., *Öst. bot. Z.*, **112**, 295-310.

570. ELODEA. St. John, H., 1965, Monograph of the genus Elodea, Summary, *Rhodora*, **67**, 155-180.

573/1. SCHEUCHZERIA PALUSTRIS L. Tallis, J. H. and Birks, H. J. B., 1965, The past and present distribution of Scheuchzeria palustris L. in Europe, *J. Ecol.*, **53**, 297-298.

598. ORNITHOGALUM. Zahariadi, C., 1965, Sous-genres et sections mésogéens du genre Ornithogalum et le valeur comparative de fleurs caracterès différentials, *Rev. Roum. Biol., Sér. Bot.*, **10**, 271-291

602/1. COLCHICUM AUTUMNALE L. Heldmaeir, C. & Schwemmle, B., 1965. Uber die Blutenformen von Colchicum autumnale L., *Bot. Jb.*, **84**, 51-62. Studies on flower types and flower colour in *Colchicum autumnale.* —[D.H.K.]

605/18. JUNCUS ACUTIFLORUS Ehrh. ex Hoffm. Hansen, A. & Pedersen, A., 1965. Nyt kort over Juncus acutiflorus Ehrh. i Danmark, *Flora og Fauna*, **71**, 84-85. A new distribution map of *Juncus acutiflorus* in Denmark is published and commented upon.—[D.H.K.]

606. LUZULA. Chrtek, J. & Krísa, B., 1964, Notes on the Luzula spicata complex in Turkey, *Notes R. Bot. Gdn. Edinb.*, **25**, 163-164. A revision of the *Luzula spicata* complex in Turkey, including the description of two new species—*Luzula pindica* (Hausskn.) Chrtek & Krísa, comb, nov. (*L. bulgarica* subsp. *pindica* (Hausskn.) Chrtek & Krísa) and *L. turcica* Chrtek & Krísa, sp. nov.—**[D.H.K.]**

606. LUZULA. Chrtek, J. & Krísa, B., 1965, Bemerkungen zu den mediterranean Arten Luzula spicata-Komplex, *Nov. Bot. Hort. Hort. Bot. Univ. Prag.*, **1965**, 27-29. *Luzula spicata* subsp. *mutabilis* Chrtek & Krísa is raised to specific rank as *L. hispanica* Chrtek & Krísa, sp. nov. It is found in the Pyrenees, Spanish mountains, etc.—[D.H.K.]

606/6. LUZULA SPICATA (L.) DC. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Luzula spicata (L.) DC., *Univ. Colo. Stud. Ser. Biol* No. **17**, 17. *Luzula spicata* (L.) DC. *sensu lato* has been reported to include taxa with three chromosome numbers, $2n=12$, 14 and 24, in Europe, whereas only plants with $2n=24$ have been detected in North America. The plant of western North America differs from the European and eastern North American populations in having distinctly shorter capsules, and is given the name *L. spicata* subsp. *saximontana* Löve & Löve, nom. nov., based on *L. spicata* var. *nova* Smiley.—[D.H.K.]

611/2. LEUCOJUM AESTIVUM L. Mennema, J., 1965, Leucojum aestivum L. indigeen in Nederland en Belgie, *Gorteria*, **2**, 149-153. The author reviews the distribution of *Leucojum aestivum* in western Europe, and compares associated species found with it in the Netherlands and Belgium with similar associations in Ireland and France. It is concluded that *L. aestivum* is native in the Netherlands and Belgium.—[D.H.K.]

612. GALANTHUS. Artiushenko, Z. T., 1965, A contribution to the taxonomy of the genus Galanthus, *Bot. Zh. SSSR*, **50**, 1430-1447.

626. Epipogium. Vermeulen P., 1965, The place of Epipogium in the system of Orchidales, *Acta Bot. Neerl.*, **14**, 230-241. The stamen of *Epipogium* has a discrete filament and there is no broad insertion of the large anther. In the anther the pollinia and the caudicles develop differently from those of the *Orchioideae* in a way characteristic of the genus. The rostellum consists of a simple gland crowning the top of the median stigmatic lobe. This gland lies on top (is acrotonic) of the pollinia (and not basitonic). The common characteristics make it clear that the genus Epipogium should be referred to the contribe of the *Neottianthae* (subfamilia *Epidendroideae*).—[Author's summary.]

628/2. Listera cordata (L.) R. Br. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Listera cordata (L.) R. Br., *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 19. *Listera nephrophylla* Rydberg, which occurs in the Pacific area of the United States, is reduced to *L. cordata* subsp. *nephrophylla* (Rydberg) Löve & Löve.—[D.H.K.]

632/1. Liparis loeselii (L.) Rich. Molinier, R., Quezel, P. & Tallon, G., 1965, Note sur le Liparis loeselii (L.) Rich. du marais de Raphèle (B. du Rh.), *Bull. Soc. Bot. Fr.*, **111**, 368-373. *Liparis loeselii* was rediscovered in a bog after being absent for 11 years. The associated species suggest that it is a glacial relict.—[D.H.K.]

633/1. Corallorhiza trifida Chatel. Sommerville, A. H., 1965, Corallorhiza trifida Chatel in north-east Scotland, *Trans. Proc. bot. Soc. Edinb.*, **40**, 129. *Corallorhiza trifida*, a very local species in Scotland, has been discovered in Kincardineshire.—[D.H.K.]

642/2×644/1. ×Orchiaceras spuria (Camus). Peitz, E., 1962, Orchiaceras spuria Camus, *Die Orchideen*, **13**, 183-185. An account, and description, of the hybrid between *Aceras anthropophorum* and *Orchis militaris*.—[D.H.K.]

650. Lemna. Guern, J., 1965, Corrélations de croissance entre frondes chez Lemnacées, *Ann. Sci. Nat.*, **6**, 1-156. An extensive account of experimental work on the study of the interaction of factors controlling the growth of fronds in *Lemna trisulca* and *L. polyrhiza*.—[D.H.K.]

654/4. Eriophorum vaginatum L. Löve, A. & Löve, D., 1965, Taxonomic remarks on some American alpine plants: Eriophorum vaginatum L., *Univ. Colo. Stud. Ser. Biol.*, No. **17**, 13. *Eriophorum vaginatum* falls into three reasonably distinct races which the authors regard as good subspecies. *E. vaginatum* subsp. *vaginatum* has a European, west and north Asiatic range, whereas subsp. *spissum* (Fern.) Hultén occurs in North America. The south-eastern Asiatic plant of Manchuria, North Korea and Japan, etc., is referred to subsp. *faurei* (E. G. Camus) Löve & Löve, comb. et stat. nov.—[D.H.K.]

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and "anterior edge of the sheath" should be considered as a unit. This unit presents a morphological gradation along the principal axis of the plant. A morphological interpretation of the ligule in Carices is proposed as a thesis for future work.—[Authors' summary, translated by E.B.B.].

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In the present work the problem is illustrated through observations and experiments. The observations relate mostly to archaeological excavations, where certain plant species had a meteorical occurrence. The experiments were made with archaeologically dated soil samples spread out in a special greenhouse, and the species which germinated from the samples were recorded. The investigation showed the following points: The seeds of many weed species may remain viable in the soil for at least 100-600 years, and *Chenopodium album* and *Spergula arvensis* for 1700 years. The optimum environment for the seeds to preserve their viability seems to be a slightly moist soil, deficient in oxygen. Controversial points include especially the question of whether the seeds are lying in a primary position. It is proved that the "hardness" of seeds had disappeared when the samples were spread; it must be supposed that seeds, which have remained viable in the soil for several centuries have long been imbibed and have hardly had any metabolism in this environment which is deficient in oxygen. Attention has especially been paid to *Hyoscyamus niger*, and observations and experiments on the biennial variety show a close correlation between the characters of the seed and the pattern of the occurrence of the plant.—[Author's summary.].

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Descriptions are provided of the various species and line drawings illustrate the differences between *Trientalis europaea* L. and *T. borealis* Raf. and between *Bidens bipinnatus* L. and *B. subalterans* DC.—[D.H.K.]

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STEFUREAC, T. I., 1965, Pontisch-sarmatische Elemente in der Flora Rumaniens, *Rev. Roum. Biol., Sér. Bot.*, **10**, 51-68.

STOYANOV, N., 1965, Phytogeographic elements in the flora of Bulgaria, *Rev. Roum, Biol., Sér. Bot.*, **10**, 69-70.

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TUTIN, T. G., 1965, Recent advances in European taxonomy. The general picture, *Rev. Roum. Biol., Sér.*, **10**, 11-17.

VALENTINE, D. H., 1965, Recent advances in cytotaxonomy in Europe, *Rev. Roum. Biol., Sér. Bot.*, **10**, 19-25.

WALTERS, S. M., 1965, Documentation and abstracting for the European flora, *Rev. Roum. Biol., Sér. Bot.*, **10**, 123-124.

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EXHIBITION MEETING, 1965

An Exhibition Meeting was held in the Department of Botany, British Museum (Natural History), London, S.W.7, on Saturday, November 27, 1965, from 2.00 p.m. to 5.30 p.m.

About 250 members and guests attended and exhibits were arranged by individuals. An account, compiled by Dr. J. G. Dony, of these exhibits, based on notes supplied by exhibitors, is given below.

SYNTHESISED *CIRCAEA ALPINA* × *LUTETIANA*

Circaea × *intermedia* Ehrh. has long been regarded as a probable hybrid between *C. alpina* L. and *C. lutetiana* L. because of its combination of intermediate characters and sterility. Yet it often grows in districts (including the whole of Ireland) where *C. alpina* is absent, and synthesis of a hybrid of *C. alpina* and *C. lutetiana* does not seem to have been reported.

During 1961 the exhibitor tried crossing these two species, and found that *C. alpina* will readily produce viable seed with *C. lutetiana* pollen: several seedlings were raised in 1962 and one flowered for the first time in 1965. The reciprocal cross, *C. lutetiana* ♀ × *alpina* ♂, was not successful.

The artificial *C. alpina* ♀ × *lutetiana* ♂ has intermediate characters and sterile anthers, like wild *C.* × *intermedia*, and it is probably identical with some forms of that variable plant. Until the artificial hybrid has produced more flowers, and young fruits*, for study, it would be premature to claim that this exercise is in fact the synthesis of *C.* × *intermedia*. But at least it is proved that hybridisation between *C. alpina* and *C. lutetiana* can take place.—P. M. BENOIT.

ODONTITES LUTEA (L.) REICHB. IN BERKSHIRE

About 1000 plants of this South European species were found near an old aerodrome at Aldermaston, Berks (v.c. 22) in September 1965. They were growing in gravelly soil with native plants such as *Agrostis tenuis* and *Hypericum perforatum*. The plants might easily be passed over as *Odontites rubra* when they are not in flower.

It seems likely that this annual semi-parasitic species has been established here for some years, probably since the war. It was probably introduced accidentally from France in the same manner as *Ononis natrix* and *Stachys recta*, which were temporarily established at the end of the last war on a nearby aerodrome. The only alien species growing with the *Odontites* was *Juncus tenuis*.

Mrs. B. H. S. Russell has very kindly provided coloured drawings of the plant which she made in September.—H. J. M. BOWEN.

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*The fruits normally fall without developing properly in *C.* × *intermedia*, and it is to be expected that they will in the artificial hybrid also.

THE THREAT TO UPPER TEESDALE

The exhibit prepared by the Northumberland and Durham Naturalists' Trust consisted of:

(a) Maps showing in Upper Teesdale: the area of international biological importance and the position of the proposed reservoir; the concentration of fourteen rare species; the late glacial and present distribution of *Betula nana* recently found there.

(b) Photographs of the area to be flooded and several "Teesdale" species.

(c) The following statement on the threat:—

Planning permission is now being sought by the Tees Valley and Cleveland Water Board to build a reservoir at Cow Green. They propose a dam 70 feet high and 2000 feet long above the waterfall at Cauldron Snout which would assure a steady flow of water to the whin sill rocks below. The reservoir would extend almost 3 miles up the river into the Moor House National Nature Reserve forming a square mile of water.

The Northumberland and Durham Naturalists' Trust and the Botanical Society of the British Isles oppose this plan because:—

> A most serious consequence of the dam would be the extensive damage to the unique plant communities. Fourteen eminent scientists wrote "the saving of its remarkable complex of plant communities dependent upon unusual geological formations must rank as the most urgent conservation issue in Britain at the present time".
>
> Generations of undergraduate students in the natural sciences have been trained here; parties from schools make continual use of the area for teaching purposes.
>
> Every year naturalists from all parts of Britain, individuals or parties visit this unique area for recreational study.
>
> The dam will regulate the highest spates which make the waterfalls of High Force and Cauldron Snout so spectacular.
>
> Control of the river flow will affect adversely plant communities by the River Tees for several miles below Cauldron Snout.
>
> This attempt to satisfy temporarily the immediate demand of industry for water must not be allowed to destroy a unique area whose research potential would still be increasing long after industry has turned to other sources of water. Essential and urgent industrial needs can and must be met from supplies outside this area of international scientific importance.

WHAT YOU CAN DO

The Botanical Society of the British Isles and the Northumberland and Durham Naturalists' Trust have jointly launched an appeal to establish an Upper Teesdale Defence Fund.

The BSBI and the Naturalists' Trust will be lodging an official objection to the proposals of the Water Board. The scientific facts and the views of leading biologists, geologists and geographers are being assembled and will be submitted as evidence in support of this objection, at the Public Inquiry.

YOUR SUPPORT, MORAL AND FINANCIAL, FOR OUR CASE IS VITAL. Please send your contributions to the Secretary, Botanical Society of the British Isles, British Museum (Natural History), Cromwell Road, London, S.W.7.—DR. MARGARET E. BRADSHAW.

WATSONIAN VICE-COUNTIES

One-inch Ordnance Survey Maps showing the boundaries of the Watsonian vice-counties.—J. E. DANDY.

EXPERIMENTS CONCERNED WITH THE DISTRIBUTION OF *HORDEUM MURINUM* IN BRITAIN

In the British Isles, *Hordeum murinum* does not occur at altitudes above 600 feet or in places where the rainfall is higher than about 40 inches per year. The exhibit was an experiment designed to discover which factors prevent *Hordeum* (which is an annual) from growing at higher altitudes and in higher rainfall areas. The experiment showed that above altitudes of 600 feet *Hordeum* sets progressively less viable grain and these are progressively smaller in size. Above about 800 feet no viable grain is set at all.—A. W. DAVISON.

SINGLE SPORE CULTURES IN *EQUISETUM* PROTHALLI

Though rarely seen in nature *Equisetum* prothalli have been grown in laboratory cultures by many workers over the last hundred years. However, Hurel-Py (1949) and Castle (1953) were the first to cultivate them under aseptic conditions on chemically defined media, but both these workers refer to their cultures as being crowded.

Sporne (1964) obtained single spore cultures under sterile conditions and the prothalli exhibited here were grown by his method. Single spores are grown to mature prothalli bearing archegonia and antheridia and in some cases young sporophytes (*E. fluviatile* and *E. palustre*) in test tubes on sterile Beijerinck nutrient agar slopes.

The exhibit illustrated the range of form in prothalli of seven species of *Equisetum*: *E. arvense* L., *E. fluviatile* L., *E. palustre* L., *E. ramosissimum* Desf., *E. scirpoides* Michx., *E. telmateia* Ehrh., and *E. variegatum* Schleich.

The *E. ramosissimum* prothalli, from the sole British locality near Boston, Lincs., have never been grown before.

By growing the prothalli under carefully controlled conditions it is hoped to throw light on some of the factors involved in sex determination in *Equisetum* and also to understand more fully the establishment of new individuals of *Equisetum* from gametophytes in the field.

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—J. G. DUCKETT.

THE LIBRARIAN'S PLACE IN BOTANICAL RESEARCH

The stock of a special library today is no longer a mere collection of books and archives; it is made effective in numerous ways for the benefit of its users. Its library staff have professional training and subject knowledge. The services such a library provides include:—(1) Acquisition of all relevant literature; (2) Provision of current awareness services (library bulletins; accession lists); (3) Information retrieval (classed stock; analytical indexing; subject catalogue and other special indexes); (4) Loan, photocopy etc., and translation services.—Miss P. I. Edwards.

BOTANICAL PAINTINGS OF WOOL ALIENS

—Mrs. B. Everard.

POSTAGE STAMPS OF BOTANICAL INTEREST

—Mrs. A. N. Gibby.

ASTER TRIPOLIUM VAR. *DISCOIDEUS*

The existence in the British Isles of the rayless form of *Aster tripolium* has been known for well over a century and it has usually been regarded as a casual, retained in saltmarsh populations by chance or by a low level of recurrent mutation.

The exhibit was of work which suggests that the discoid form may be more widespread than was previously thought, and may have a selective advantage with respect to the degree of tidal submergence the plant is able to stand. Work on two Lincolnshire and a Norfolk salt marsh suggests a marked differential distribution of the two morphs, the Null hypothesis that they have a random distribution along the halosere being rejectable on the basis of statistical counts (the rayless form being found in proportionally greater numbers in the lower zones).

There is some evidence too that the polymorphism for the ray character is transient, the rayless form being an aggressive and invading type which has increased on many east coast marshes over the past 20 years at the expense of the normal form. Results of preliminary work on the inheritance of the ray character were shown and it revealed how the discontinuity between the rayed and non-rayed forms is possibly blurred by the existence of intermediate, partially rayed hybrid forms produced in the population by random gene flow between two inter-fertile habitually outbreeding homozygotes (herbarium sheets and a scatter diagram for meristic variation in ray florets in a wild population were shown).

Work is being continued on the evolutionary significance of the non-ray gene and its possible selective value (as indicated by linkage or pleiotropy) in the physiological situations of the lower salt marsh, as well as on its mechanism of inheritance.

A request for material, observations and/or records was made to be sent to A. J. Gray, Department of Biology, University of Keele. —A. J. Gray.

THE OCCURRENCE OF *BETULA NANA* IN UPPER TEESDALE

During May, 1965, a small colony of *Betula nana* was discovered in Upper Teesdale, the first station for the species in England. Elsewhere in Britain it is confined to the Scottish Highlands. The exhibit showed a rooted cutting of the Teesdale material and lists of associated species in Teesdale and Scotland showing their close similarity. Recently leaves of *B. nana* in a good state of preservation were found in a 'fen' peat close to the Teesdale colony. It is suggested that this peat is, at the earliest, peri zone V. It seems likely that the colony is a relict one perhaps dating back to the late-glacial period. Leaves and photographs of these peat remains were exhibited.—J. C. HUTCHINSON.

SURVEY OF THE WEST LANCASHIRE FLORA

The exhibit showed details of the organisation of the survey together with results obtained in the first two years.

The results, collected on a 2 x 2 km. square basis, showed that records had been received from approximately 75% of the vice-county with about 100 species recorded from each square.—E. F. GREENWOOD.

VARIATION IN *RANUNCULUS FICARIA*

Photographs and microscope slides of chromosome preparations showing mitosis and meiosis in diploid and tetraploid plants of *Ranunculus ficaria sensu lato* were exhibited. Other photographs and specimens illustrated the results of cultivation in uniform conditions for more than a year of samples from 20 wild populations drawn largely from Kent, Essex and Surrey. Nine of the samples were tetraploid and eleven diploid, including two with accessory chromosomes. Both diploid and tetraploid samples were variable in a number of morphological characters, including some which have been considered to be of value in distinguishing the polyplotype. Several characters appeared, from the rather limited sample, to be correlated with chromosome level in the conditions of cultivation adopted. Noteworthy among these were:—

CHARACTER	DIPLOID	TETRAPLOID
Aerial bulbils	Absent	Develop after flowering
Achene development	Majority mature	Very few mature
Lower surface of petals	Anthocyanin present & petal appears rather reddish beneath	Anthocyanin absent — petal usually greyish beneath
Position of cauline leaf	In the lower ⅓ of the pedicel	In the upper ⅓ of the pedicel
Habit	Rather erect and compact	Loose and spreading

—B. M. G. JONES.

WINTER TWIGS

The exhibit staged under the auspices of Messrs. Hillier & Sons of Winchester, Hants, consisted of two parts, winter twigs and hollies.

WINTER TWIGS

Various species and cultivars of *Salix* and *Cornus* were shown with their attractive twigs as well as a number of more unusual and curious plants such as *Corokia cotoneaster* the "Wire-netting Bush" and *Corylus avellana* 'Contorta' the "Wiggly Hazel" or as it is affectionally called "Harry Lauder's Walking Stick Plant".

HOLLIES

Many species were shown, some in fruit and surprised members with their variable appearance and structure. *Ilex crenata* with its black fruits and small neat leaves looked for all the world like some form of the common Box.

Also shown was a large selection of cultivars (garden varieties) of our own native English Holly (*Ilex aquifolium*). It was amazing how so many combinations of colour and such weird and wonderful forms could have arisen from the familiar green leaved red fruited tree of our woods and hedgerows.

Altogether, 25 species and 50 cultivars of *Ilex* were exhibited.—C. R. LANCASTER.

(a) *ERICA TETRALIX, E.* × *PRAEGERI* AND *E. MACKAIANA*

Chance collections at the end of a visit to north-west Ireland in July 1965 suggested that the status of *Erica* × *praegeri* needed re-examining, or the specific limits of *E. tetralix*, or both; and that these studies might help throw light on the status of *E. mackaiana.*

Three of the sheets of dried specimens exhibited were collected in districts, notably the Dowros peninsula, County Donegal, where *E. mackaiana* is unknown, but nevertheless they approached it in varying degrees, i.e. they came at least within the ambit of *E.* × *praegeri.* Similar plants have previously been recorded from Portacloy in County Mayo by J. G. D. Lamb (1964) and a sheet from that locality was also shown. Specimens of *E. tetralix* from other places, with more or less hairless sepals, some actually said to be approaching *E. mackaiana*, may be seen in various of our Herbaria.

The object of the exhibit was to encourage visitors to north-west Ireland, and indeed to other such areas, to examine closely apparent *E. tetralix* and to look for aberrant forms and to report results.

I should add that I use the name *E.* × *praegeri* for the locally plentiful plant, a name indubitably given to this plant, rather than *E.* × *stuartii. E. stuartii* is an oddity, a single plant of uncertain parentage collected once only, and now existing only in gardens. For these and other seasons (McClintock, 1965) it should be treated solely as a cultivar, *E.* 'Stuartii'. A sheet of this was also shown to demonstrate how distinct it is in flower and foliage.

REFERENCES

LAMB, J. G. D., 1964, On the possible occurrence of *Erica mackaiana* Bab. in Co. Mayo, *Ir. Nat. J.*, **14**, 213-4.

McCLINTOCK, D., 1965, Notes on British Heaths, 2—Hybrids in Britain, *Year Book of Heather Soc.*, **1965**, 12-13.

(b) BAMBOOS IN FLOWER

Bamboos notoriously flower only at intervals, which may be as long as 60 years apart, and then tend to flower everywhere and profusely, although spasmodic flowering may occur in between. 1965 was remarkable in the exceptional number of species which were flowering. Very few photographs or drawings of bamboos in flower exist and none in easily accessible publications. Consequently it was thought worth exhibiting some actual specimens to show what the flowers were like. The exhibit included nearly 60 examples of 10 different species collected recently in flower. It also gave an indication of how widespread the flowering had been, specimens coming from all over the British Isles, and these collected without any special journeys.

Flowering of bamboos is easily overlooked, the inflorescences being not showy and often hidden among the stems or foliage. Indeed people have even failed to spot the flowers in their own garden until they were shown them, and others have asked what was wrong with their plants, not recognising that they were in flower. Flowering causes at least a setback but does not, in most of our species, seem to result in the death of the entire plant. Observations of this feature, however, would be welcome.

The naming of bamboos and their generic and specific limits are difficult for a variety of reasons: consequently few names can confidently be relied on. Bamboos are mostly large plants and more than one sheet of herbarium paper may be needed to show the various characters used for identification. Apart from the flowers, these include stem height, branches, colour, shape, hollowness and various features of the sheaths; leaf size, shape, veining, margins, colour, pubescence and sheaths; and whether the rhizome is short or far-spreading. Some of these characters, notably caducous sheaths, show only on young shoots.

One of the commonest species, which can spread into very extensive patches, is *Sasa palmata* (*senanensis*). This is usually readily distinguished by its large leaves. It is generally not as tall as many other species, 4 feet to 7 feet, although it may reach 12 feet. The earliest specimen I have seen of this species in flower recently is dated 1961. Its flowering has increased ever since and seems now to be very general, although some clumps have apparently not yet started. I myself saw flower in every vice-county I was in in 1965 and in which I noted any *Sasa*, and have records of it from 26.

Flowering of a particular clump of bamboo, and a clump can extend for many yards, can go on continually for two or three years or longer. Being generally an uncommon event, records should always be made of it, accompanied, because of the uncertain nomenclature, by a pressed specimen and full notes. Immediate pressing of collected material is necessary, otherwise the leaves curl rapidly.

Seed appears, nowadays at any rate, to be rarely produced on most species in this country and its existence should be carefully noted. There was only one seed on all the specimens exhibited, on *Arundinaria japonica* from Bath. Seeds from *Phyllostachys* have also been seen recently, and germinated.

The question of whether a plant is naturalised or wild or not is harder to settle in bamboos than in any other group of plants. But about ten species are well established outside gardens, some of them extensively. They should be considered just as much part of our wild flora as Snow berry (*Symphoricarpos rivularis*), *Spiraea* species, Salmonberry (*Rubus spectabilis*) or other such successful suckering plants.

A tentative list of the names of the species in flower, the last form not wild, may be *Sasa palmata* (Burbridge) A. Camus, *Arundinaria japonica* Sieb. & Zucc., *A. simonii* C. & A. Rivière, *A. humilis* Mitf., *A. fastuosa* (Mitf.) Mak., *A. nitida* Mitf., *A. anceps* Mitf., *A. marmorea* Mak., *A. graminea* (Bean) Mak., *Shibatea kumasasa* (Steud.) Mak., *Phyllostachys bambusoides* Sieb. & Zucc. 'Castillon'.

In addition to the first seven, the following may also be seen naturalised: *A. mureliae* Gamble, *A. vagans* Gamble, *A. tecta* (Walt.) Ruchl., *A. chrysanthe* Mitf., *Sasa veitchii* (Carr.) Redh.—D. McClintock.

NATIVE AND ALIEN SPECIES OF *HORDEUM* FOUND IN BRITAIN

The exhibit comprised British Museum Herbarium specimens of *Hordeum,* illustrations of clusters of spikelets (from A. Nevski's monograph of *Hordeum, Acta Inst. Bot. V. L. Komarovii Acad. Sci. U.S.S.R.*, Ser. 1, **5**, 64-255, 1941) and a key to the species. The following species were shown: (1) native: *H. secalinum* Schreb., *H. murinum* L. and *H. marinum* Huds.; (2) introduced, mostly wool aliens: *H. jubatum* L., *H. pubiflorum* Hook. f., *H. violaceum* Boiss. & Huet, *H. compressum* Griseb., *H. muticum* Presl, *H. glaucum* Steud., *H. leporinum* Link, *H. geniculatum* All., *H. flexuosum* Nees ex Steud., *H. pusillum* Nutt., and *H. euclaston* Steud.; and (3) cultivated barleys found occasionally as escapes: *H. distichon* L. and *H. vulgare* L.—A. Melderis.

TETRAPLOID *SILENE VULGARIS* (MOENCH) GARCKE IN EUROPE

Most of the chromosome counts made in the *S. vulgaris* complex have been diploid ($2n=24$). Tetraploid numbers ($2n=48$) have also been reported by Larsen for plants from the Canary Islands close to subsp. *commutata* (Guss.) Hayek (1960) and for Italian populations of subsp. *commutata* (1963). Blackburn & Morton (1957) found tetraploid plants in Portugal. We now report a tetraploid number for two plants from the Alpes Maritimes in the south of France: one from Cap-Martin (near Menton) and the other from Gorbio. Morphologically the two populations concerned belong to subsp. *vulgaris* (*Flora Europaea,* Vol. **1**, 1964).

The size of stomatal guard cells of the abaxial epidermis varies between 30 and 39μ in the tetraploid plants examined, and between 22 and 29μ in a diploid plant from Madeira grown in the same conditions. However wild-collected herbarium specimens do not conform to this pattern, showing a much more continuous variation.

Meiosis was studied in two tetraploid plants from the Alpes Maritimes. The number of bivalents varies from 5 to 16, and the number of univalents from 1 to 6. Many complex multivalents involving commonly from 4 to 8 chromosomes are constantly found. An 11-valent was also observed.

Without further studies we cannot explain these complex meiotic associations, nor the origin of the tetraploid populations.

REFERENCES

Blackburn, K. B. & Morton, J. K., 1957, The incidence of polyploidy in the Caryophyllaceae of Britain and Portugal, *New Phyt.*, **56**, 344-352.

Larsen, K., 1960, Cytological and experimental studies on the Flowering Plants of the Canary Islands, *Biol. Skr. Dan. Vid. Selsk.*, **11** (3), 1-60.

———, 1963, *In litt. ad* S. M. Walters.

—Pierre Morisset.

ARMERIA MARITIMA (MILL.) WILLD. VAR. *PUBIGERA* (DESF.) BOISS. IN IRELAND

An interesting variety of sea-pink has recently been found on the west coast of Ireland which differs from the type in having pubescent involucral sheaths and bracts, and conspicuously hairy leaves. This appears to compare only with the plant which was originally described by Desfontaines as *Statice pubigera*, but is now known as *Armeria maritima* (Mill.) Willd. var. *pubigera* (Desf.) Boiss.

A native of coastal rocks in Portugal and N.-W. Spain, it is an addition to the Lusitanian element in the Irish flora and has been found growing in some quantity on micaceous rocks on Achill and Inishbofin, also on coastal limestone pavement in the Burren and Aran Islands.

Although forms of *A. maritima* occur quite frequently with very pubescent leaves, the bracts and involucral sheath are normally glabrous. *A. maritima* var. *pubigera* appears to be distinctly local in distribution and is apparently confined to Portugal and N.-W. Spain, where it is found growing with forms of *A. maritima*. In the Irish stations it is easily recognised by the silveriness of the plant and the pubescent bracts and involucral sheath.

Specimens and photographs of *A. maritima* var. *pubigera* and the type were exhibited, with maps showing the known distribution of the variety in Ireland, and in Portugal and Spain.—Miss C. W. Muirhead.

HELIANTHEMUM CHAMAECISTUS: SOME PRELIMINARY RESULTS.

—M. C. Proctor.

DISTRIBUTION MAPS OF KENT PLANTS

Cardamine bulbifera

This species, which appears rarely to set seed in this country, has a Kent and E. Sussex distribution on the woodlands of the sandy areas of the High Weald. It occurs both in dry plateau woodlands and along stream banks in a rather disjunct pattern, and its micro-distribution pattern may reflect dispersal by water of the vegetative bulbils which appear to be its chief mode of reproduction.

Caltha palustris

This species is common and abundant in base-rich swamps and carrs throughout the well-watered country adjacent to the spring-bearing chalk, Lower Greensand and Thanet sand areas of Kent, but much rarer on the

Low and High Wealds, where water supply is either less reliable (on the clay areas) or poor in nutrients (on the Hastings Beds). It appears to be absent from Romney Marsh.

CARDAMINE PRATENSIS

This plant is common in both moist meadows and in woodlands on neutral to base-rich gleyed soils over clays over most of Kent, but becomes quite rare eastwards on the clay-with-flints plateau of the chalk, though common on the clay-with-flints in mid and West Kent. This distribution, the reverse of that shown by *Paris* and *Allium ursinum*, may be climatic in cause, but is not so far satisfactorily explained. It is also rarer on the eastern Weald clay than in the west. The north Kent coastal plain appears to be too dry climatically for it.

CARDAMINE AMARA

This has the same type of distribution as *Caltha palustris* but is much more restricted; it appears to require relatively better oxygenated waters than *Caltha*, and is slightly commoner in the ravines of the High Weald.

AGROPYRON CANINUM

This is a species of two types of habitat in Kent: (1) base-rich ash coppice on alluvium on the flood plains of the chief rivers, and (2) sheltered humid woodlands on the Chalk.

PARIS QUADRIFOLIA

This species is exceptionally plentiful in Kent, but locally so. Almost absent from the Weald, it is almost confined in the west to the gault clay and to a few places on or adjacent to the calcareous ragstone; as one travels east, it appears on the chalk and clay-with-flints, and in east Kent it is most abundant in valley side ash-oak-maple-hazel woods on Chalk. The Chalk plateau between Deal and Canterbury is almost without it; here there is no ancient woodland, the area having been disforested probably in Neolithic times. The Thanet Sands near Canterbury, which are calcareous, support a few localities.

ALLIUM URSINUM

This species shows a pattern rather similar to *Paris* in part, with increasing abundance on woodlands on Chalk and calcareous loams overlying Chalk as one travels east. But in addition, it is common on moderately to highly base-rich loams in the High Weald, being evidently less demanding in soil requirements than *Paris*. Both species, however, show a pattern which is probably in part climatically determined: the chalk hills of Kent become progressively more humid in climate, with progressively deeper, and moister loamy soils replacing shallow rendzinas, as the Straits of Dover are approached.

ANEMONE NEMOROSA

This species is almost completely distributed in all old woodlands of Kent, and in old hedgebanks too, except on the very heavy soils of parts of the Weald Clay country east of Headcorn, where it is uncommon. Even in woodlands on the chalk it occurs wherever there is any depth of true soil formation of a loamy or clayey nature—it is only absent on very shallow skeletal rendzina soils on the chalk. In alluvial marsh districts, and in almost completely disforested Sheppey, Grain and Thanet, it is unknown to-day.—F. **Rose**.

IDENTIFICATION PLEASE?

This exhibit was an alien which had been grown on in a garden.—Mrs. P. **Saunders**.

J. E. Lousley identified the plant as "A *Bidens* found as a wool alien at Charlton, Worcestershire, which may be *B. subalternans* DC.".—**Ed**.

HYDROCHARITACEAE OF THE MANCHESTER CANALS

Fresh and herbarium specimens of *Hydrocharis morsus-ranae, Stratiotes aloides, Vallisneria spiralis, Egeria densa, Elodea canadensis* and *Lagarosiphon major* from Manchester canals were exhibited. The first two are natives and the last two well established in many places but *Egeria* and *Vallisneria* are not truly naturalised as around Manchester at least they seem to be dependent on warm effluents from mills. They are thus often ephemeral in appearance since mills frequently temporarily or permanently cease to function or change to power not producing warm water. At present *Egeria* is locally very common in several mill-lodges but *Vallisneria* very rare or perhaps, like *Najas graminea*, extinct.

The six species provide very interesting studies in vegetative propagation and floral biology. Most of the non-natives originate as waste from aquarists' shops, but *Egeria* particularly is harvested by aquarists in some of its localities, and may in some cases have been deliberately 'planted'. —C. A. **Stace**.

TURNER'S *LIBELLUS* (1538) AND *NAMES OF HERBES* (1548))

William Turner (c. 1508-68), clergyman, physician, herbalist and naturalist, had a turbulent and varied career, including two periods of exile (1540-47 and 1553-58) from England on account of his Protestant religious opinions: these found expression in vigorous controversial writings, which led to his works being banned and destroyed during his exile. Probably for this reason, and also because the chances of survival over several centuries of a small unillustrated and seemingly unimportant booklet are low, Turner's first two works on plants, *Libellus de Rei herbaria* (1538) and the *Names of Herbes* (1548), are extremely rare. Nevertheless these modest forerunners of Turner's *New Herball* (1551-68) are the first two printed books relating to British plants which have any claim to originality. They merit the attention of British botanists because they contain the first records of many British species and mention in print for the first time many English vernaculum names, some of which, such as Loosestrife, Goatsbeard, Hawkweed, Larch, Oxeye, etc., were coined or introduced by Turner. One such record as noted by Jackson is of *Mercurialis* 'cantabrigie in horto aulae regiae', *i.e.*, in the garden of King's Hall, Cambridge, which later became part of Trinity College. They also contain the first records of various cultivated plants in England. The

Names of Herbes mentions many German vernacular names picked up during Turner's exile in Germany and these should be studied in conjunction with the herbals of Brunfels and Fuchs: Turner's work seems to have escaped the attention of German botanists. So far only one extant copy of the '*Libellus*' and five copies of the *Names of Herbes* have been traced. B. Daydon Jackson published in 1877 a facsimile of the *Libellus* and James Britten in 1882 a reprint of the '*Names*', but these have become relatively difficult books to procure. Jackson's, which contains a life of Turner, seems to have been limited to under 100 copies.

To make these rare and interesting works again available the Ray Society has now published a volume, edited by W. T. Stearn, containing a reprint of Jackson's life of Turner, facsimiles of the '*Libellus*" and *Names of Herbes* and lists of modern scientific equivalents for the names used by Turner.

The exhibit consisted of volumes of this Ray Society publication (No. 145: price £3) and specimen pages exemplifying Turner's first records of British plants and his first use of vernacular names now current.—W. T. Stearn.

SOME INTERESTING PLANTS PHOTOGRAPHED DURING 1965

—L. S. Whicher.

A NEW HAMPSHIRE FLORA

This exhibit consisted of:

(a) Maps showing the progress in recording in Hampshire both before and since the death of A. W. Westrup who began collecting material for a revised Flora.

(b) Some interesting specimens collected in 1965.—Mrs. M. P. Yule.

From 4.15 p.m. the following members gave short lectures and showed colour slides in the Lecture Hall.

4.15 p.m.	Dr. S. M. Walters and T. G. Collett.	Teesdale.
4.45 p.m.	Dr. H. J. M. Bowen.	Some plants from the Alps.
4.55 p.m.	H. J. B. Birks and Miss H. H. Lees.	Lappland Flowers.

REPORT OF THE COUNCIL FOR 1965

The report and audited accounts cover the period from 1st January to 31st December 1965. Figures in brackets are the comparative figures for 1964.

We greatly regret the death of H.R.H. The Princess Royal, our Patron for many years. We are pleased to announce that H.M. Queen Elizabeth The Queen Mother has honoured us by consenting to become our new Patron.

During the year 135 (134) new members joined the Society and we lost 77 (85) by reason of death, resignation and the operation of Rule 29. The total membership at the end of the year was 1652 (1594) with a net gain of 58 (49). We record, also with great regret, the deaths of Prof. R. S. Adamson, a member since 1912, Mrs Hilda Drabble, an honorary member since 1935, and Mr. N. Y. Sandwith, a former Vice-President and an active and most valued member.

The Income and Expenditure Account and transactions on the Publications Account for 1965, together with the Balance Sheet as at 31st December 1965, are set out on the pages following this report. We have ended the year with a surplus, but once again this is mainly due to our not having incurred the full cost of printing and distributing two parts each of *Watsonia* and *Proceedings*. On the basis of current prices, the full cost of two parts of each of our journals would be well over £2,000.

Subscriptions show a small increase compared with 1964 because of the higher membership. Interest received is also higher as we have the benefit of the income derived from the investment of the surpluses of the past year or two. Sales of publications, however, are lower, this being due to the number of parts issued.

Expenditure calls for no special comment. No abnormal items arose in 1965 and booking fees received together with a generous contribution from Birmingham University towards the costs of the Birmingham Conference enabled us to keep the cost to the Society of field and indoor meetings to a modest figure.

Transactions on the Publications Fund have been restricted to sales from existing stocks of publications and the receipt of a further sum in respect of royalties from the *Atlas*.

Members will be aware that a Special Committee was established to organise full-scale opposition to the building of a reservoir in Upper Teesdale. A Report on the activities of the **Teesdale Defence Committee** is appended on page 10.

The Annual General Meeting and a Midlands Regional Meeting were held in April at Birmingham University in conjunction with a Conference on *Reproductive Biology and Taxonomy of Vascular Plants*, organised by Prof. J. G. Hawkes and attended by 117 members and friends. The newly constituted North-west Region held a successful inaugural meeting at Manchester University in September, organised by Dr. C. A. Stace and attended by about 50 members and friends.

The Meetings Committee, in addition to helping Prof. Hawkes with the Birmingham Conference, arranged the Annual Exhibition Meeting in November at the Department of Botany, British Museum (Natural History), by kind permission of the Keeper of Botany, Mr. J. E. Dandy. 26 (32) exhibits were staged and about 70 members and guests attended the President's Reception held later in the Board Room of the Museum.

Field meetings, at which the total attendance was 160 (187), were held at Winchester, Hants; Bury St. Edmunds, Suffolk; Tring, Herts., for the study of grasses; Westport, Co. Mayo; Brantwood, Lancs.; Newark-on-Trent, Notts., and Newport, Isle of Wight. The Irish Regional Committee organised a meeting at Clonmel, Co. Tipperary, and the Welsh Regional Committee one at Gregynog, Montgomery. Arrangements are being made for a Conference for Local Flora writers to be held at Bristol University in September next. It has been decided to incorporate the Scottish Field Programme with the general Field Programme for 1966.

Unfortunately the Society has not been able to fill the vacancy left by Mr. P. F. Hunt, who resigned last year from the office of Junior Activities Secretary. Consequently only one meeting of the **Junior Activities Committee** has been held, convened by Mr. P. C. Hall, who kindly agreed to arrange the Junior field meetings for 1966. We are indebted to Miss S. B. Dickinson who volunteered to deal with the Junior meetings in 1965, which were held at East Malling, Kent; Chiltern Hills, Bucks.; Bricket Wood, Herts.; Otford, Kent; Hense Moor, Devon; Cuckmere Haven, Sussex, and Arundel, Sussex. Meetings to Dundrum Sands, Belfast, and North Bull Island, Co. Dublin, were organised by the Irish Regional Committee; to Maeshafn, Flint and Denbigh, by the Welsh Regional Committee. Mr. Sowerby's "Beginners' Week" at Wentworth Woodhouse, Yorks., had to be abandoned owing to lack of support. The total attendance at Junior meetings was 180 (175).

The Development and Rules Committee has continued to keep both the *Panel of Referees and Specialists* and *Local Organisation: District Secretaries and Recorders* up to date. It has not been possible to publish THE DIRECTORY OF BRITISH PLANT TAXONOMISTS AND ECOLOGISTS but it is hoped to keep the MS up to date and available at the British Museum (Natural History). It has been agreed that Districts and the office of District Secretary be abandoned, subject to Rule 17 being amended; that various proposals to extend the activities of the Society be investigated; that we should offer to reimburse to any member of Council or one of its Committees any fare in excess of £3 incurred in attending meetings. Among other matters discussed were the question of paid secretarial help and the preparation of a new *Prospectus*. A Sub-committee has been set up to investigate the type and range of co-operative research project that could be carried out by members of the Society with the hope that such a scheme can be put forward to continue the interest created by the Distribution Maps Scheme. We are again indebted to Mr. D. E. Allen for continuing to act as Secretary until the return from abroad of Mr. A. C. Jermy in September 1965.

The arrangements for dealing with the sale and stock of the Society's publications, reported last year under **Publications Committee,** have proved satisfactory, thanks being due to Mr. D. H. Kent for handling all orders. Two parts each of *Watsonia* and *Proceedings* were issued during the year. A new *Instructions to Contributors* has been prepared by the Editor of *Watsonia* and appears in that journal. Further progress has been made on the handbook on *Carex*, which it is hoped to publish in 1966. Discussions on the need for a new *Comital Flora* and a second edition of the *List of British Vascular Plants* have resulted in the suggestion that they should be combined; this is under consideration. A Report (No. 9) of the Conference held at Birmingham has been edited by Prof. Hawkes and will be published in 1966.

The **Conservation Committee** has continued its active investigation of threats to the British flora, particularly the use of pesticides and toxic chemicals. Liaison meetings between the Society and the Nature Conservancy continued to be held, to which several of the many threats were referred and our connections with the Wild Plant Protection Working Party and the "Countryside in 1970" Conference were maintained.

The **Local Floras Committee** has continued to live up to its name by encouraging and assisting in, when requested, the preparation of county and local Floras. It has also submitted to Council terms of reference for a Records Committee to replace the Local Floras Committee and the **Maps Committee,** which has not met this year, and to take on some of the duties of the Development and Rules Committee. Council agreed in principle that such a Committee should be set up. Council also accepted in principle the recommendation that the Society should embark on a project of publishing local Floras at regular intervals. Other matters discussed were the standardisation of the designation of tetrads and the micro-filming of the set of maps showing vice-county boundaries.

The **Committee for the Study of the Scottish Flora** arranged as usual an interesting programme, including a week's excursion to the Isle of Mull, with shorter visits to Lochgilphead; Clyde and Mouse Gorges; the Isle of Arran, Yetholm and the Cheviot; Loch Lubnaig; Upper Strathardle and Ardrishaig. Full accounts of the work of this Committee, the **Welsh Regional Committee,** which has been actively organising the "00" Survey and other projects, and the **Irish Regional Committee** will appear in their Annual Reports to be published in *Proceedings*.

The Council thanks the many friends of the Society who have helped it to continue its work, including our Honorary Auditors, Messrs. Price, Waterhouse & Company. We are grateful to the authorities of the Universities of Birmingham and Manchester for allowing us to hold meetings there; to the Department of Botany, University College, London, and the Linnean Society of London for allowing our various Committees to meet in their premises; to the Nature Conservancy for the use of their Board Room for Council Meetings; to Trinity College, Dublin, and to the Royal Botanic Garden, Edinburgh, for allowing our Regional meetings to be held there and to the Trustees of the British Museum (Natural History) for the use of their Board Room and Lecture Hall for meetings following the Annual Exhibition Meeting. Finally, we thank the many members who have taken an active part on Committees and in many other ways contributed to our progress and well-being.

E. F. WARBURG, President.
February, 1966. E. B. BANGERTER, Hon. Secretary.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December 1965

1964			
	Cost of Printing and Distributing:		
	Proceedings, Vol. VI, Part 1 (balance) and provision for Part 2,	£771 10 7	
	Watsonia, Vol. VI, Part 2 (balance), Part 3 and provision towards Part 4 ...	790 18 1	
£1,531			£1,562 8 8
165	Printing Annual Report and Notices of Meetings ...		170 12 10
63	Expenses of Council and Committee Meetings ...		47 7 11
252	General printing, stationery, postages, telephone and petty expenses		193 17 10
79	Expenses of Regional Organisation		28 6 1
51	Field and Indoor Meetings expenses less fees received		36 12 9
615	Excess of income over expenditure credited to General Fund		878 3 9
£2,756			£2,917 9 10

1964			
£2,155	Subscriptions received ...		£2,285 3
281	Interest received		350 18
	Proceeds from Sales:		
	Proceedings ...	£97 18 0	
	Watsonia ...	181 14 10	
	Old B.E.C. Reports	1 15 0	
320			281 7
£2,756			£2,917 9

PUBLICATIONS FUND

Transactions in 1965

1964			
£24	Prospectuses and publicity ...		—
	Balance to 1966:		
	General	£1,739 14 3	
	Atlas Royalties less outgoings,	1,538 17 3	
3,042			£3,278 11 6
£3,066			£3,278 11 6

1964			
£2,643	Balance from 1964		£3,042 5
	Sales:		
243	*Conference Reports*,	£110 4 4	
4	*British Herbaria* ...	7 17 9	
16	*List of British Vascular Plants* (half share) ...	14 9 0	
19	Other Publications,	14 10 1	
			147 1
141	Royalties received on *Atlas of the British Flora*		89 5
£3,066			£3,278 11

BALANCE SHEET as at 31st December 1965

1964			
	General Fund :		
	Balance 1st January 1965 ...	£2,284 13 11	
	Add : Premium on conversion of Defence Bonds,	22 10 0	
	Excess of income over expenditure for year ...	878 3 9	
£2,285			£3,185 7 8
3,042	Publications Fund		3,278 11 6
40	Benevolent Fund		39 11 0
1,378	Creditors for Printing and General Expenses		1,353 17 1
136	Subscriptions Received in Advance		159 10 0
£6,881			£8,016 17 3

1964			
	Investments :		
	4½% National Defence Bonds ...	£1,000 0 0	
	5% National Defence Bonds ...	3,250 0 0	
	5% National Development Bonds	750 0 0	
£5,000			£5,000 0 0
	Cash at Bank :		
	Deposit Account	£2,500 0 0	
	Current Account	516 17 3	
1,881			3,016 17 3
	J. C. GARDINER, Hon. Treasurer.		
£6,881			£8,016 17 3

Audited and found correct.
14th February 1966.

PRICE WATERHOUSE & CO.,
Hon. Auditors.

AMENDMENTS TO RULES

The Council recommends the following changes to the Rules as published in 1964:—

Rule 4. Add "(f) Records".
Rule 6. Delete "and Honorary Junior Activities Secretary" and add "and" between "Honorary Meetings Secretary" and "Honorary Field Secretary".
Rule 7 (e). Delete this Section of the Rule.
Rule 17. Delete this Rule.
Rule 18. Delete "Editors" and substitute "Records Committee".
Rule 23 (b). Delete "being again proposed and seconded" and add "further application".
Rule 30 (c). Delete "District Secretaries".
Rule 34. Delete "in March or April" and substitute "not later than 15th May".

Also to change the title at top of page 5 of the Rules to read "Panel of Specialists, Referees and Recorders" and to make such adjustments in the numbering of the Rules as the above changes make necessary.

TEESDALE DEFENCE COMMITTEE

J. E. LOUSLEY—*Chairman*	DR. M. E. BRADSHAW*
D. T. STREETER—*Hon. Secretary*	E. MILNE-REDHEAD
J. C. GARDINER—*Hon. Treasurer*	DR. S. M. WALTERS
E. B. BANGERTER	

(*Representing Northumberland and Durham N.T.)

The Committee set up by Council on 25th February 1965 to organise the Society's opposition to the plans of the Tees Valley and Cleveland Water Board to construct a large impounding reservoir in Upper Teesdale, met for the first time on 7th March and has had numerous meetings since.

In order to avoid two appeals and duplication of effort, it was decided that the Committee should represent jointly the Society and the Northumberland and Durham Naturalists' Trust with Dr. Margaret Bradshaw as the Trust's permanent representative on the Committee.

The Society's Appeal for the funds needed to mount the opposition was launched at a Press Conference held on 24th August. Over 20,000 copies of a 16 page Appeal brochure setting out the basis of the Society's opposition to the plans for a reservoir at the Cow Green site were sent to the members of various scientific and horticultural societies, as well as to Members of Parliament, University Departments and a number of foreign botanists. In addition nearly 20,000 copies of the pamphlet produced by the Northumberland and Durham Naturalists' Trust were sent to members of the County Naturalists' Trust and of local organisations in the North-East of England.

The Committee initially expected that the opposition to the scheme would follow the normal course of a Public Inquiry and, therefore, retained the services of Hon. S. Silkin, Q.C., M.P., to represent it. In November, however, it was learnt that the Water Board were proceeding by way of the promotion of a Private Bill in Parliament. This involved the retention of Parliamentary Agents and the briefing of new Counsel, as Mr. Silkin was unable to appear by virtue of his position as a Member of Parliament. The Society has now retained the services of Messrs. Sharpe, Pritchard & Company, Parliamentary Agents, and of Mr. Harold Marnham, Q.C. The opposition to the Cow Green Scheme will be heard by the appropriate Parliamentary Committee at the Committee stage of the Second Reading of the Bill, probably in March or April 1966.

Witnesses for the Society are expected to include Professor H. Godwin, F.R.S., Professor C. D. Pigott, Professor D. H. Valentine, Professor R. S. Silver (desalination), Dr. A. Johnson (Geology), and Miss C. M. Rob (Natural History). In addition the Society will have the advice of Consultant Civil Engineers and a Consultant Water Engineer.

A statement of receipts into and payments out of the fund is appended. At 31st December 1965 only £6,500 was available to meet the heavy legal and other costs which will be incurred whilst opposing the Bill, possibly in both Houses of Parliament. These costs will be considerably higher than previously expected and further donations to the fund are, therefore, urgently needed. They may be sent to The Treasurer, B.S.B.I., c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

J. C. GARDINER, Hon. Treasurer.

REPORT 27 JUNE 1966

Since the issue of the Society's Annual Report and Accounts (to which was appended a brief statement by the Teesdale Defence Committee) developments in connection with the opposition to the Upper Teesdale Reservoir scheme have been disappointing.

The General Election involved the postponement of the setting up of the Select Committee of the House of Commons which would hear the Bill and the proceedings before that Committee did not commence until 4th May 1966. During the succeeding four weeks, however, the Committee heard leading and junior Counsel for both parties as well as a large number of witnesses both for the Promoters and for the opposing Petitioners headed by the B.S.B.I. Only by extending the time of their sittings were the Select Committee able to complete the proceedings by Friday, 27th May. They then announced their general acceptance of the reservoir proposal, subject to the elimination from the Bill of a clause which permitted the reservoir and surrounding land to be used for recreation purposes and subject to a request that the parties should examine the possibility of restricting grouting (a process of injecting cement, under pressure, into the ground with the object of sealing off leaky fissures or mine workings). The latter request was made in order to minimise the damage to the remaining areas of high scientific interest, which would not be flooded. The Committee then adjourned until 21st June.

Throughout the proceedings (despite contrary evidence submitted by engineers and geologists acting for the B.S.B.I.) the Water Board had contended that grouting would not be necessary. Nevertheless, during the adjournment the Promoters made known that they could not agree to a clause restricting grouting in a manner which precluded damage above the proposed top water level and that they were arranging for further exploratory borings to be undertaken in the area, in order to determine whether or not grouting would be necessary and if so, its extent and location. Therefore, when the Select Committee reassembled on 21st June, the B.S.B.I. asked that a final decision should be deferred until the result of these further borings was known, because until then the evidence was clearly incomplete. However, the Committee decided neither to defer their decision nor to require any amendment to the Bill which would preclude grouting such that extensive damage may be done to areas well above the proposed top water level.

The matter will now go through its final stages in the House of Commons (where a debate may be demanded) and if, as must be expected in view of the report of the Select Committee, passed by that House, will move on to the House of Lords, probably in October. As the results of the further trial borings will not become known until September or October, the Teesdale Defence Committee must clearly continue its opposition to the Bill in the House of Lords. At the time that this note goes to press, they are busy preparing their further plans and a circular will be sent to all members of the Society and other supporters, as soon as possible.—J.C.G.

TEESDALE DEFENCE FUND

Receipts and Payments to 31st December 1965.

Receipts—						
Donations Received				£8,143	7	4
Interest Received				55	2	3
				£8,198	9	7
Payments—						
Printing of Appeal brochure, envelopes and other stationery, costs of despatching				£975	7	5
Postages on distribution of Appeal brochure and on reply envelopes				537	5	4
Publicity				45	12	4
Travelling Expenses				45	13	11
Other expenses, including postage other than on Appeal brochure and reply envelopes				65	10	0
				1,669	9	0
Balances in Hand—						
Deposit Account	£6,000	0	0			
Current Account	529	0	7			
				6,529	0	7
				£8,198	9	7

J. C. GARDINER,
Hon. Treasurer.

Audited and found correct.
14th February 1966.

PRICE WATERHOUSE & CO.,
Hon. Auditors.

MEMBERSHIP SECRETARY'S REPORT FOR 1965

One hundred and thirty-five new members joined the Society during 1965. This was 1 more than in 1964 and 63 fewer than in 1963. Membership made up as follows:—

New ordinary members	104
junior members	22
family members	4
subscriber members	5
	135

Losses were 77. This was 8 fewer than in 1964 and 6 more than in 1963. 48 members resigned, and 18 ceased to be members under the operation of Rule 29. We deeply regret having to record the death of the following eleven members:—Professor R. S. Adamson, M.A.; Philip J. Bourne; Miss Helen M. Brown; Mrs. E. Drabble; Mrs. G. C. Gibson; J. B. Gillies, M.P.S.; S. Ashton Hill; W. F. C. Marwood, F.C.A.; W. A. Richardson; N. Y. Sandwith, M.A., F.L.S.; and Dr. E. Scott.

New ordinary members are:—Dr. A. Adams, G. C. G. Argent, J. L. Bailey, J. S. Bazzard, Miss J. B. Bobear, Ph.D.; Miss J. G. Brown, T. J. Brown, R. M. Burton, W. L. Chick, J. A. Collier, R. F. Deans, R. A. Dossetter, J. G. Duckett, Miss S. Edwards, R. P. Ellis, R. A. Finch, Miss M. Freegard, Professor J. H. Fremlin, I. M. Frenguelli, P. R. Gatehouse (rejoined), J. G. Gilchrist, R. H. T. Gipps, B. Goggin, Miss B. Greenup, E. Griffiths, J. V. Griffiths, Miss E. S. Haines, J. Hamblin, Miss C. Hankin, K. C. Harris, H. J. Harrison, Mrs. H. V. Hawkins, A. J. Healy (rejoined), J. A. Hearne, C. R. F. Hedley, M. Hickey, C. F. Hill, Mrs. J. M. Holloway, P. J. A. Howard, Miss B. Humfrey, E. T. Hunter-Blair, Dr. T. C. Hutchinson, Mrs. W. D. Hyde, Miss R. Hartas Jackson, A. Jarvis, A. Vaughan Jones, Allan S. Jones, Mrs. N. M. Kelcey, Miss C. J. Kelsall, Miss R. Kilby; R. B. Knox, B.Sc., Ph.D. (rejoined), Miss D. Lamble, J. Latham; G. Leute, stud. phil.; Miss M. F. Lloyd, J. A. Lowe, Miss B. O. Lowne, R. McBeath, A. D. Matthews, Miss D. Maxey, Mrs. M. Meikle, Miss M. G. Monger, P. Morisset, Mrs. E. Norman; A. M. O'Sullivan, Ph.D.; J. R. Palmer, A. A. Vernon Paul, Mrs. E. M. Pearce, Miss J. E. Pollard, J. T. Radford, A. J. Richards; W. D. Richardson, B.Sc., M.I.Biol.; E. A. K. Ridley, Dr. H. Riedl, A. Roberts, Miss E. Rogers, Dr. U. Rowlatt, Mrs. J. Sadow (rejoined), H. A. Sandford, J. F. Savage, P. D. V. Savage, D. R. Seaward; Mrs. J. V. M. Seib, B.Sc.; R. E. Shapland, B. Shepard, H. A. Shrimpton (rejoined), R. Sibson, J. H. Silverwood, Miss C. Simmonds, R. J. Skerrett, Mrs. J. A. H. Smallwood, L. F. Stearn (rejoined), H. J. C. Sturton, W. J. Sutherland, Miss R. F. L. Thomas; C. Timms, F.R.E.S.; Miss P. B. Topham, Mrs. M. Unwin; H. Vannerom, t.ing.; Miss L. J. Walley; G. E. Wickens, B.Sc., F.L.S.; Mrs D. Will, B.Sc.; R. G. Williams, Mrs. P. Wolseley.

New junior members are:—F. Bennett, Miss P. Birkett, P. Bridgewater, T. Cairns, Miss R. M. Cutting, J. M. Daly, Miss M. Fitton, Miss G. Greeff, Miss A. C. Gundry, Miss L. Kendrick, Miss R. Lillyman, P. Lullman, G. Norman, Miss S. M. Nye, Miss D. O'Reilly, J. Protheroe, S. A. Renvoize, J. M. Roberts, Miss M. A. Sanders, Miss C. Spence, M. J. C. Staples, Miss J. M. Wilkinson.

New family members are:—William E. Hughes, Mrs. J. N. Mills, Mrs. J. R. Palmer, Mrs. R. Slater.

New subscriber members are:—Brecknock County Naturalists' Trust Ltd.; Oundle School Natural History Society; Quebec Ministere de l'Agriculture; Millfield School Biology Dept., Street; William and Mary College Library, Williamsburg (rejoined).—C. M. DONY.

ANNUAL GENERAL MEETING, 23rd APRIL 1966

The Annual General Meeting of members of the Society was held in the Jodrell Lecture Theatre, Royal Botanic Gardens, Kew, on Saturday, 23rd April 1966, at 12 noon.

The President (Dr. E. F. Warburg) was in the Chair and 74 members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. 6, Part 2, pages 188-189, were adopted.

REPORT OF THE COUNCIL

The Report of the Council together with the accounts for the year 1965 had been circulated to all members. There were no queries and the Report and accounts were adopted.

CHANGE OF RULES

The President said that eight changes of Rules were proposed by Council. In Rule 4 the addition of "(f) Records" was required since the Records Committee had been set up to take the place of the Maps Committee and the Local Floras Committee. Under Rule 6 it was proposed that "and Honorary Junior Activities Secretary" be deleted. The Society was having difficulty in finding a Secretary for the Junior Activities Committee and it was felt that a volunteer might be forthcoming if he or she were not taxed with being an officer of the Society. The amendment of this Rule necessitated the deletion of section (e) of Rule 7. With the implementation of the Regional organisation within the Society, Council felt that District Secretaries were no longer required, so proposed the deletion of Rule 17. With the appointment of the Records Committee, records would in future be dealt with by this committee and not by the Editors, so amendment of Rule 18 was proposed accordingly. Since it was no longer necessary for intending members to be proposed and seconded, Rule 23 (b) required amendment in respect of Junior Members who could become Ordinary members without further application. Consequently, on the deletion of Rule 17, it was necessary to delete District Secretaries in Rule 30 (c). Finally, Council proposed that Rule 34 be amended to permit the Annual General Meeting to be held not later than 15th May. It was unlikely that the Meeting would be held before the middle of April, but permitting a later date would increase the scope of activities associated with the Annual General Meeting.

These changes of the Rules were accepted by the Meeting.

ELECTION OF OFFICERS

The President thanked the Officers of the Society for their help during the past year when he had been unable to do as much as he would have wished.

Vice-Presidents. Dr. S. M. Walters, Dr. J. G. Dony and R. Mackechnie retired under Rule 9. Dr. Walters was not eligible for re-election and the President thanked him for the work he had done on behalf of the Society and hoped that he would continue to serve in other capacities.

Dr. Dony and Mr. Mackechnie were eligible for re-election and Council proposed the re-election of these members and the election of E. Milne-Redhead as Vice-Presidents. Their election was proposed from the Chair and carried unanimously.

HONORARY OFFICERS. E. B. Bangerter had been nominated by Council for re-election as Honorary General Secretary, J. C. Gardiner as Honorary Treasurer, Dr. M. C. F. Proctor as Honorary Editor of *Watsonia*, Mrs. Mary Briggs as Honorary Meetings Secretary and P. C. Hall as Honorary Field Secretary. D. H. Kent had resigned from the office of Honorary Editor of *Proceedings* and Mr. Bangerter, on behalf of Council, proposed E. F. Greenwood for this office. The election of these officers was proposed from the Chair and carried.

The President expressed the gratitude of the Society to Mr. Kent for his long service as an Honorary Editor. He said that Mr. Bangerter and Mr. Hall were willing to accept office for a further year only and that replacements for these Officers would have to be considered by Council in the coming year.

ELECTION OF MEMBERS OF COUNCIL

In accordance with Rule 10 Mrs. A. H. Sommerville, Dr. D. H. Dalby and E. Milne-Redhead retired. D. E. Allen, Dr. H. J. M. Bowen, R. S. R. Fitter, Prof. J. G. Hawkes, Dr. D. T. Streeter and Dr. S. M. Walters had been nominated and a ballot was held to elect three members to serve on Council, Dr. Hubbard and Mr. Milne-Redhead acting as tellers. Mr. Allen, Mr. Fitter and Dr. Walters were elected, their seniority being decided, in the order shown, by lots drawn by the Chairman.

ELECTION OF HONORARY MEMBER

The election of D. H. Kent as an Honorary Member had been proposed by Council. The President said that no member of the Society had done so much behind the scenes as Mr. Kent, in addition to acting as Honorary Editor and Assistant Secretary. He had also found time to write papers for the Society's publications. He had great pleasure in putting forward Mr. Kent's name for election as an Honorary Member. Mr. Kent was elected with acclaim from the membership.

Mr. Kent said that he appreciated the honour accorded him by his election and thanked the membership for its kind gesture. He had enjoyed the office he had held over the years and in some ways regretted relinquishing it. He hoped that members would give his successor the support they had given him, particularly in submitting papers for *Proceedings*.

ELECTION OF HONORARY AUDITORS

Council recommended the re-election of Messrs. Price, Waterhouse & Co. who had kindly agreed to continue this work on an honorary basis. Their election was duly carried and the President expressed the Society's thanks for their services.

After Mrs. Russell had expressed the members' thanks to the President for conducting the meeting so expeditiously, he declared the meeting closed at 12.40 p.m.

J. F. H.
E. B. B.

IRISH REGION REPORT FOR 1965

The Summer field meeting in July (6 days) on Clonmel, had a total attendance of 21, including those who remained for only part of the time. Six B.S.B.I. squares were thoroughly surveyed, and another partially so.

The Junior field meeting (one day), held in June on the Dundrum Sands, Co. Down, and led by Mrs. Gunning, had an attendance of 5 juniors and two teachers. The Junior field meeting on the North Bull Island, Co. Dublin, held in September (afternoon), and led by Fr. Moore, had an attendance of 35 Juniors and 6 teachers, all from girls' schools.

Members of the B.S.B.I. resident in Ireland were the guests of the Belfast Naturalists' Field Club on 5th June. The afternoon excursion was along the Lagan towpath.

The Autumn Regional Meeting was held on 30th October in the New Science Buildings of University College Dublin. Miss P. Boyle spoke on recent observations on *Spartina* in Ireland and Dr. P. W. Williams dealt with the glacial history of the Burren Region in relation to its flora and fauna. The exhibition included living and herbarium specimens of recent interesting plant finds in Ireland and data on the Flora of Armagh and Flora of Connemara and the Burren projects.

At the Annual General Meeting which followed, it was proposed and carried unanimously that the present regional committee retain office for the coming year.

FLORA OF CONNEMARA AND THE BURREN

A sub-committee consisting of Professor Webb, Miss Scannell, M. Mitchell and Fr. Moore has been formed to look after affairs of the Flora project. Work has begun on the recording and 54 points were surveyed during the season.

The Praeger Fund made £20 available to defray printing expenses and also £75 per year for the next three years as a grant towards field expenses to be administered by the sub-committee. £15 of this year's grant has been assigned to a party from Leicester University and the remainder of the grant was carried over to next year.

Trinity College, Dublin, gave a grant of £50 towards secretarial and stationary expenses.

FINANCES

Postage and stationery expenses for the year amounted to £4. 2. 11. which has been refunded from the central account by the Hon. Treasurer.
—JOHN J. MOORE, S.J.

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA
ELEVENTH ANNUAL REPORT TO 31st DECEMBER 1965

The Committee met twice, each time in Perth, and an Exhibition meeting was held jointly with the Botanical Society of Edinburgh, at the Royal Botanic Garden, Edinburgh (by kind permission of the Regius Keeper) and afterwards at the University Staff Club.

Eight field meetings were arranged, but one (Yetholm and The Cheviot joint with N.E. Region, B.S.B.I.) was cancelled owing to lack of support. The remainder were Lochgilphead, May 21-24, led by A. A. Slack (c. 6); Clyde and Mouse Gorges (Lanark), June 12-13, led by R. W. Scott and Miss E. P. Beattie (9); Isle of Mull, June 26 to July 3, led by Miss E. P. Beattie and Miss U. K. Duncan (7); Loch Lubnaig, July 11, led by A. Robson (c. 10); Isle of Arran, July 12 to 17, led by Mrs. A. H. Sommerville (3); Upper Strathardle, July 30 to August 2, led by Bruce Ing (5); and Ardrishaig, August 7-8, led by A. G. Kenneth (10). The figures in brackets are the numbers of people attending each meeting.

The Exhibition meeting was attended by about 60 people of whom about 45 were present for the evening session. D. M. Henderson was unable to give his talk owing to illness, and instead three shorter talks were given by: J. Grant Roger on The Vegetation of St. Cyrus National Nature Reserve; Dr. Denis Ratcliffe on Habitats of some mountain plants in Scotland and the Alps, and Miss C. W. Muirhead on Distribution of some Scottish Species. The following exhibits were shown:

Sorbus rupicola in Scotland	A. McG. Stirling
Asplenium septentrionale in Ireland	A. McG. Stirling
Potentilla crantzii and *P. tabernaemontani* in Scotland	A. A. Slack
Herbarium Specimens of Plants from South Scotland	H. Milne-Redhead
Ranunculaceae	Miss U. K. Duncan
Hybrid Salices	Miss U. K. Duncan
Armeria in W. Ireland	Miss C. W. Muirhead
Seaweeds from Colonsay	E. Todd

During the evening slides were shown by Mrs. A. H. Sommerville and J. Grant Roger—1965 field meetings; A. McG. Stirling—Plants of the Burren; Dr. Todd—British Orchids; Mrs. Ritchie—Swiss Plants; Miss E. Bullard—Plants of Orkney.

The composition of the Committee remained the same as the previous year and was administratively uneventful.

Two one-day meetings, one two-day meeting and two longer meetings were arranged for 1966. The Autumn Exhibition meeting will be held in Glasgow on Saturday, November 12, 1966, in conjunction with the Andersonian Naturalists of Glasgow.

It is a pleasure to express thanks to the officers of the B.S.B.I. and B.S.E., and to all those who have generously given of their free time to help the Committee carry out its activities.—D. Ratcliffe.

WELSH REGION REPORT FOR 1964-65

It is encouraging to record a continuing small but steady enrolment of new members during the year, to give a current regional total of 77 excluding institutions.

The Welsh Region Bulletin was published in January, May and September, the latest issue being No. 6. Its popularity may be inferred from the steady growth in the number of subscribers amongst members outside the Region which has increased by 12 in the year under review. Dr. Seddon has regretfully resigned his function as alternate editor.

The development of an improved system of County Recorders has proceeded well. Several new Recorders have been invited by the committee and now eleven of the thirteen counties are served by a locally resident Recorder. A standard form of index card has been produced and will shortly be made available to Recorders throughout Wales.

The '00' Survey which was initiated a year ago is now in progress under the direction of Dr. Savidge and he has produced a descriptive and explanatory booklet for participating members and the appropriate recording sheets and cards. All of the field meetings this season have been devoted in part to work for this Survey.

Eight field meetings were held, seven of these being two-day week-end meetings and one of a week's duration at Gregynog Hall. Attendances at meetings with few exceptions have been satisfactory and the situation and accommodation at Gregynog Hall had commended it strongly as a very suitable venue for gathering of members from all parts of Wales and with easy access from England too.

The project to prepare a book on the distribution and habitats of plants in Wales for publication in 1970 was put into effect by the Welsh Flora Sub-committee which decided to produce three chapters for preliminary submission to possible publishers next winter.

The Welsh Region Committee met twice in Aberystwyth and once in Llandovery with attendances of 7, 7, and 5 respectively. The Terms of Reference proposed by the Welsh Region Committee as its own Constitution were submitted to the Society's Development and Rules Committee on 19th January 1965 and were approved.— B. SEDDON.

SOUTH-EAST REGION MEETING, 1966

A meeting of members resident in the South-East Region was held in the Jodrell Lecture Theatre, Royal Botanic Gardens, Kew, on Saturday, 23rd April, 1966, at 12.40 p.m., following the Annual General Meeting of the Society. Forty-seven members were present.

The President, Dr. E. F. Warburg, was elected to the Chair. The main business was to elect a Regional Representative to serve on the Society's Council to replace Mrs. B. H. S. Russell who was retiring after four years service on Council. The President thanked Mrs. Russell for her services.

The only nomination had been P. J. O. Trist, O.B.E., proposed by Mrs Russell, seconded by Dr. Perring. Mr Trist was declared elected.

There being no other business the meeting closed at 12.50 p.m.—J. F. Hall.

BOOK REVIEWS

A Guide to Herbarium Practice. By J. W. Franks. Pp. 34. The Museums Association Handbook for Museum Curators, Part E, Section 3. 1965. Price not stated.

This work with a promising title contains much that will interest those concerned with herbarium work. The author is Keeper of the Department of Botany at the Manchester Museum and was previously in the Department of Botany at the British Museum (Natural History). He also acknowledges the assistance given to him by Dr. C. E. Hubbard of the Herbarium at the Royal Botanic Gardens, Kew. The reader has some assurance that with experience in or advice from the three largest English herbaria Dr. Franks will have something original to say but the work applies only to the conditions to be found in these and perhaps three other British institutions. These all know, or it is a sorry state of affairs if they do not, all that is contained here and the Guide is of no use to the hundreds of museums and libraries and private collectors struggling to do their best with smaller herbaria which contain in all more specimens than the larger ones. Dr. Franks himself admits that these collections may be useful but offers no assistance to those in charge of them who most desperately need and would gladly accept advice. Above all there is nothing here to help anyone starting a herbarium as all it contains is applicable to someone taking over a collection of a million or more specimens. To take a simple example, Dr. Franks writes that there is a standard size of herbarium sheet of between 16 in. × 10 in and 17 in. × 12 in. This is a strange concept of a standard and the author could have drawn attention to the great advantage in having 15 in. × 11 in. for a new collection. Four sheets of this size can be cut from Imperial size paper 30 in. × 22 in. and this is stocked in a wide range of qualities by suppliers of drawing paper in every large town. Larger sizes can only be supplied to a special order or at great expense and may suit the needs of large institutions ordering sheets in great quantities. Smaller herbaria using moderate supplies of paper choose unusual sizes with disaster.

Among the more useful features of the Guide is a list of addresses from which materials may be obtained. There is great need for a book of the kind that this was intended to be and it is to be hoped that the Museums Association will persuade Dr. Franks or someone else to produce something much better.—J. G. Dony.

Glossary of the British Flora. By H. Gilbert-Carter. Third edition. Pp. xxiv + 96. Cambridge University Press. 1964. Price 18/-.

It is a rare thing indeed for a glossary to become a 'best seller', but the fact indeed that Dr. Gilbert-Carter's *Glossary of the British Flora* has resulted in three revised editions since 1950 speaks for itself.

In the latest edition the author has added about 150 entries, and in his own words has 'improved the definitions of some of the old ones', thus making it a valuable companion to the second edition of Clapham, Tutin and Warburg's *Flora of the British Isles,* published in 1962.

I would urge those interested in the complexities of the scientific names of plants to acquire this excellent little volume as soon as possible for it is almost certain to go out-of-print.—D. H. KENT.

William Turner: Libellus de Re Herbaria, 1538; The Names of Herbes, 1548. Facsimiles, with introductory matter by James Britten, B. Daydon Jackson and W. T. Stearn. Pp. ix + 275. The Ray Society, London. 1965. Price £3.

William Turner, the 'Father of British Botany', was the author of a number of original works on British botany, and the two earliest, *Libellus de Re Herbaria* (1538) and the *Names of Herbes* (1548), have the distinction of being the first books to provide detailed localities of British plants. As is only to be expected, both books are now extremely rare, and only one copy of the *Libellus* and five copies of the *Names of Herbes* are known to exist. A facsimile of the *Libellus,* probably limited to less than 100 copies, was produced by B. Daydon Jackson in 1877, and a reprint of the *Names of Herbes* was published under the editorship of James Britten in 1882. Like the original works these reprints are now also very rare. The Ray Society are therefore to be congratulated upon reproducing an excellent facsimile edition of these two important volumes.

The book under review commences with an account of the *Libellus* and the *Names of Herbes,* together with an account of Turner's career by Dr. W. T. Stearn, this is followed by a biographical notice of Turner by B. D. Jackson, first published in 1877, then followed by a facsimile of the *Libellus.* The remainder of the book is devoted to a facsimile of the *Names of Herbes,* preceded by James Britten's preface to his 1882 reprint of the work. Finally lists are provided of the English and scientific names of plants mentioned in the *Names of Herbes,* taken from Britten's 1882 reprint, and a revised list of modern scientific names with the English names assigned by Turner to each.—D. H. KENT.

PERSONALIA AND NOTICES TO MEMBERS

SUSSEX NATURALISTS' TRUST LTD.
SUSSEX FLORA COMMITTEE

A meeting of the above was held on 26th November 1965, and it was agreed that post-1950 records for a new 'Flora of Sussex' should be collected throughout the county on the basis of the 2 km. National Grid Squares, using the S.-E. B.S.B.I. Mapping Cards. Would anyone interested in assisting with this field work please contact the General Director, O. Buckle, 105 Rowlands Road, Worthing, Sussex.

FLORA OF NORTH EBUDES, V.-c. 104

R. I. Sworder, Little Dudswell, Northchurch, Berkhamstead, Herts., is collecting data for a flora of North Ebudes, v.c. 104, and would be most grateful for any records and assistance from interested members.

COLOUR TRANSPARENCIES OF EUROPEAN FLORA

O. Polunin, Dormers, Farncombe Hill, Godalming, Surrey, would like to thank all those who have so generously offered to lend transparencies of European flowering plants in the past year (1965); they number over fifty persons.

He now has illustrations of the majority of the 800 species or so required, but there are still gaps in the collection and a list of final requirements is available for anyone else who would like to participate. A final selection will be made in September-October 1966.

Photographs of interesting species from the Iberian Peninsula and from east European countries would be particularly welcome. All transparencies will be returned within a few days on the first scrutiny.

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr. F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr. Perring (address as above) include:

1. 35 mm. filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards. Price 15/- per hundred.
3. Individual Record Cards. Price 10/- per thousand.
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5. Base maps of the British Isles with 100 km. grid (quarto) at 2d. each.
6. Corrections to the *Atlas of the British Flora*: free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed would you please send us a copy?

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF "*WATSONIA*" AND "*PROCEEDINGS*"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part 5, and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. D. Streeter, 193 London Road, East Grinstead, Sussex, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee (Dr. D. Streeter, 193 London Road, East Grinstead, Sussex), who will send a form listing the detailed information required by the

Nature Conservancy. The forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

CHALK GRASSLAND

An attempt is being made to collate all available information on chalk grassland ecology. In this connection it would be appreciated if any member engaged in or having information on any aspect of research connected with chalk conservation, ecology or vegetation would please send details to the Secretary of the B.S.B.I. Conservation Committee (Dr. D. Streeter, 193 London Road, East Grinstead, Sussex). If this information has already been sent either to the Nature Conservancy's Research Section at Monks Wood or to the Secretariat of the County Naturalists' Trust Committee of the S.P.N.R. details are not required but only a note indicating the subject of the work.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Secretary of the Conservation Committee (Dr. D. Streeter, 193 London Road, East Grinstead, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seeds or other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

4 OCT 1965

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This Society has sections covering all aspects of natural history and in particular botany and ecology. Lectures and field meetings are arranged and research work carried out. Most of these activities take place within the Society's area, that is within a 20-mile radius of St. Paul's.

Special attention is paid to botanical subjects in the Society's publication, "The London Naturalist", and the Botany Section has a herbarium. The Society has a library housed at Ealing Public Library and botanical journals are circulated to members through reading circles.

Further details can be obtained from the General Secretary:

Mrs. L. M. P. Small,
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Continued from inside front cover.

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OF THE

BOTANICAL SOCIETY OF THE BRITISH ISLES

Editor: E. F. GREENWOOD

Vol. 6 MAY 1967 Pt. 4

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Continued on inside of back cover.

JOHN MARTYN'S BOTANICAL SOCIETY: A BIOGRAPHICAL ANALYSIS OF THE MEMBERSHIP

By D. E. Allen

Introduction

The middle years of the eighteenth century, from 1715 to 1770, after the death of Ray and Petiver and before the great surge of interest brought about by the Linnaean System and the Romantic Movement, constitute a relatively little-known period in the history of British botany and indeed a notably quiescent time for the biological sciences in general. It is therefore of considerable moment to discover more about the small Botanical Society that flourished in London between 1721 and 1726, under the secretaryship of John Martyn, later Professor of Botany at Cambridge. For not only was this apparently the first formally-constituted body of any stature devoted specifically to botany to exist in Britain, and perhaps even in the world, but it came into being at a time when interest in the field sciences had at last become sufficiently widespread for its devotees to meet and work in groups, thereby making possible the engendering of a common tradition in field methods, equipment and terminology.

It is necessary to qualify the claim made for this Society with the words 'first formally-constituted', in order to take account of the earliest body known to have existed in this field, the Temple Coffee House Botanic Club, lately brought to notice by the researches of Pasti (1950) and Stearns (1953). Unlike the Society examined in this paper, this club appears to have lacked any formal organization and was evidently never more than a loose coterie of friends. Its existence is only known from the private correspondence of its members, a truly brilliant assemblage which included Sloane, Lister, Tancred Robinson, Nehemiah Grew, William Sherard, Petiver, Buddle, Doody, Plukenet, Samuel Dale, Charles Du Bois, William Vernon and Dr. Henry Compton, Bishop of London. In the spring of 1691 the membership totalled as many as forty. Meetings took place at the coffee house every Friday evening, and on Sundays and occasional holidays in the summer months there were excursions to places of interest in and around London. Founded apparently in 1689, the year William and Mary came to the throne, the club is known to have survived till at least as late as July, 1713, the date of a pass granted to the members to proceed to Gravesend which has been accidentally preserved in the Sloane collection.

The further qualification 'of any stature' is also necessary to exclude at least two other, comparatively insignificant clubs that are known to have existed prior to 1720. One of these was a small club started by Dr. Patrick Blair around 1706 in connection with the physic garden at Dundee (Gorham, 1830). The other was founded at Boston, in Lincolnshire, in 1711 by Dr. William Stukeley, shortly after settling in that town as a physician. 'The apothecarys and I', he records, 'went out a simpling once a week. We bought Ray's 3 folios of a joint stock' (Lukis, 1880, p. 122).

Martyn's Botanical Society certainly could never be claimed as the intellectual equal of the Temple Coffee House Club—which was really an unofficial appendage of the Royal Society at one of its periods of greatest renown—but equally clearly, as will be seen, its standards must have been higher than a cursory reading of the accounts of the Society that have come down to us might suggest. These accounts are, in fact, highly repetitive and can be shown to have been ultimately derived from a sole single printed source: Thomas Martyn's memoir of his father (1770). This can be usefully supplemented, as Edwards (1963) has pointed out, with information culled from one of the Society's minute-books, which survived among the Martyn papers and was passed to Banks and thus in due course to the British Museum (Natural History). A second minute-book (containing as well the original rules) was presented by Thomas Martyn to the Linnean Society in 1807 but has since, unfortunately, been lost. A third source, which till now has remained unexplored, is the private correspondence of the period, particularly the numerous letters from Blair in the Martyn Correspondence. For the rest, we have only such biographical data of the known members as can be pieced together on which to draw.

Origin of the Society

The Society was founded in 1721, the year following the bursting of the South Sea Bubble (of which the only faint echo to be heard is the ruin of Chandler's brother and sister-in-law) and the year preceding Walpole's emergence as leader of the government. George I had been on the throne seven years. Petiver, one of the last major figures of the preceding botanical generation, had died not long since, in 1718, without leaving any obvious disciples—unless this description could be said to include Isaac Rand. Buddle and Doody had also passed on, Samuel Dale was marooned in the depths of Essex, James Sherard increasingly seduced from field botany by his garden. Of the other foremost figures remaining, only Sloane and William Sherard still performed on the centre of the stage; but the latter spent much time abroad and Sloane, now sixty, was increasingly immersed in public affairs—and their interest in the flora of Britain was, in any case, only marginal. Thus, for the first time for many years, British botany found itself in a vacuum.

John Martyn, the founder of the new society, was at this time just twenty-two, a bored clerk in the counting-house of his father, a Hamburg merchant, off Cheapside. His interest in botany had only really developed some three years before and the forming of his herbarium had hardly begun. Letherland and, more particularly, Wilmer had already become good friends of his, the three probably having met on the excursions of the Society of Apothecaries (which interested outsiders were permitted to attend). These excursions or 'herbarizings' were botanical field classes which the Society had long provided, in connection with its Chelsea Physic Garden, as part of the formal education of its apprentices. They can be traced back in the records to 1620 and may well be older still. By this time one was held in each of the six summer months, normally under the leadership of a special official of the Society called the Demonstrator of Plants. The rendezvous was at six o'clock in the morning, traditionally at this period (Wilmer *in litt.* to Martyn, April, 1720) at a place called Joe Hill's.

The leader on at least some of the 'herbarizings' in these years was the popular and capable Isaac Rand, who had inherited an apothecary business in the Haymarket from his father. Praised as a botanist of great promise by Plukenet as long ago as 1700, he was now, at the age of about forty-five, a highly experienced veteran; and it was probably due largely to him, through the keenness his teaching instilled in some of the more earnest of his pupils, that the Botanical Society—which was clearly very much an offshoot of the Apothecaries' excursions—was brought into being.

These excursions appear to have been notorious, at certain periods, for their rowdiness. An entry in the minute-book of the Physic Garden Committee dated February, 1724, records that 'several complaints have of late been made of disorders frequently happening on the days appointed for the private herbarizing'. As a result it was laid down that apprentices who wished to attend must in future bring a permit from their masters. This tightening up of discipline looks very much like the work of Rand, who about this time was made Director of the Garden. And it may be that the Botanical Society met with his every encouragement just because it offered itself as a kind of intellectual greenhouse, in which the tender shoots of learning put forth by the more promising of his pupils could be shielded from the uncongenial outside climate. Certainly, Rand's term of office seems to have coincided with a period of great activity in the affairs of the Garden, reinforced by the arrival of Philip Miller as Gardener in 1722, the year in which Sloane at long last settled the Garden on the Society of Apothecaries. After Rand's death in 1743, the excursions seem to have gradually lapsed again into indiscipline, reaching a nadir under William Hudson, the over-mild author of the *Flora Anglica.* It was apparently at the latter that complaints were chiefly directed by several apothecary masters in 1767: they had been deterred, they protested, from sending their apprentices 'to the Lectures and Botannick Walks, so often as they would have done, by the Irregularity and Indecent Behaviour of some Persons who have frequented those Walks, fearing their own apprentices might be corrupted by such Examples' (Wall, Cameron & Underwood, 1963).

Apart from Rand, the suggestion of a botanical society might also have been made to Martyn by his friend Patrick Blair, who had already had experience of one at Dundee. Blair, like Rand another link with the previous generation, had become acquainted with Martyn some years earlier shortly after his release from Newgate, where he had been imprisoned for implication in the Jacobite Rebellion of 1715. In April, 1720, however, he left London to become Physician to the Port of Boston and thereby perhaps forfeited his chance of being asked by the Society to become its President.

The President who was in fact secured was Dillenius. Preceded already by an international reputation for his work on fungi and mosses, Dillenius was brought over from Germany by William Sherard to work as his botanical amanuensis in August, 1721. As he presumably spoke little English and was still unfamiliar with the English botanical world, it is hard to believe that he played any active part in the formation of the Society. But assuming that Martyn waited for a president to be found before proceeding further with his plans, the inaugural meeting must presumably have occurred sometime that autumn. This is perhaps confirmed by the fact that four years later, at any rate, the Annual General Meeting 'to elect a President' was held around Michaelmas (at the end of September)—as mentioned in a letter Martyn wrote to Sloane in that year in an abortive attempt to persuade him to honour the Society by becoming its next President. Dillenius had apparently stayed in office till then, his increasing irascibility perhaps being the eventual cause of his decision to resign. A patently thin-skinned person and much inclined to overwork, he seems to have suffered from considerable nervous strain building up at times into mild paranoia—until he met Linnaeus in 1736 he was convinced the *Genera Plantarum* was written against him—and this may have owed something to, and certainly cannot have been helped by, his need to depend totally on the benevolence of the Sherards. Martyn and Miller both exasperated him, and it is not unlikely that the Society had already been subjected to bouts of the *furor teutonicus* that we find breaking surface in 1727 in a letter to Samuel Brewer: 'As to Martyn publishing descriptions and figures of the new plants about London, I believe this hath been underhand and carried on for some time past—Miller I take to be the chief contriver; for Martyn does not know a Nettle from a Dock' (Turner, 1835, p. 286). A year or so later he quarrelled with Brewer too. Lord Petre, a leading horticulturalist, dismissed him as nothing but 'an arrant old woman' (Turner, 1835, pp. 313, 316). Nevertheless, despite his temperament, his abilities were undeniable; and the invitation to him to edit the greatly extended 1724 edition of Ray's *Synopsis,* in itself an impressive tribute to such a recent immigrant, clearly coincided usefully with his Presidency in bringing him into touch with this group of very willing young field-workers. The Society, as a result, was both a parent and a child of the Dillenian *Synopsis,* at once the handbook for the next generation of British botanists, and many contributions made by the members appear in its pages or in the *Synopsis* herbarium at Oxford (cf. Druce & Vines, 1907; Clokie, 1964).

The meetings of the Society took place each Saturday at six in the evening, at first in the Rainbow Coffee House in Watling Street and later in a member's home. According to its rules, every member in turn was obliged to exhibit a certain number of plants each time and to make observations on their uses and any other characteristics of special interest—in other words, every member his own Demonstrator of Plants.

THE MEMBERS

The names of twenty-three members are known, most of them being listed by Martyn (1770) and a further six (probably not founder-members) referred to in the 1724-26 minute-book. Four of them, Martyn (1699-1768), Dillenius (1684-1747), Rand (c. 1675-1743) and Philip Miller (1691-1771) are well enough known and sufficiently covered in the *Dictionary of National Biography,* if not elsewhere, to render any further detailed accounts superfluous. Of the remaining names, all but two can now be identified; and even for the few about whom a certain amount has been known already considerably more can now be revealed for the first time.

To avoid much repetitive citation, certain sources which have been drawn on fairly generally in securing the biographical details that follow are listed below:—

Minute-books of the Chelsea Physic Garden Committee (Guildhall Library).

Registers of apprentice bindings and freedoms, of the Society of Apothecaries; and of the Company of Surgeons (Guildhall Library).

Lists of members of the Society of Apothecaries living in and about the City of London, 1693-1752 (British Museum).

The Martyn Correspondence (Dept. of Botany, British Museum (Natural History)).

Munk's *Roll of the Royal College of Physicians of London,* Ed. 2 (1878).

Nichols' *Literary Anecdotes* (1812-15) and *Illustrations of the Eighteenth Century* (1817-58).

Foster's *Alumni Oxonienses,* Early Series (1891)

Venns' *Alumni Cantabrigienses,* Part I (1921-27).

The five members about whom a good deal has already been revealed in the botanical literature are described first.

VINCENT BACON (*d. 1739*) *SURGEON-APOTHECARY*

Brought up in Grantham, Lincolnshire, he was perhaps the son of the Rev. Edward Bacon. The Rev. Francis Bacon, a Cambridge graduate and headmaster of the Grammar School at Grantham from 1729 to 1768, was probably a brother. Apprenticed in the Society of Apothecaries to John Payne in June, 1718, he was admitted a Freeman in July, 1729—an abnormally long apprenticeship of eleven years, perhaps interrupted by illness or absence from London. In July 1728 he also became a Freeman of the Company of Surgeons, by payment. During this period as an apprentice he evidently returned to Grantham for vacations, a list of plants from that district, contributed in 1726, appearing under his name in the Botanical Society's minute-book. This list includes what is now known to be the first British record of *Armeria maritima* subsp. *elongata* (Hoffm.) Bonnier (Gibbons & Lousley, 1958), but apart from a record for *Cerastium arvense* L., taken from it by Martyn (1732), it remained unnoticed until published by Woodruffe-Peacock (1898). By February 1732 he was established in the practice at Christchurch, Spitalfields, in which he was to continue till his early death—contrary to the statement by Martyn (1770) that he later practised at Grantham, for which no evidence can be found. In that month he delivered a paper to the Royal Society on "The case of a man who was poisoned by eating Monk's-hood or *Napellus*", subsequently printed in the *Philosophical Transactions,* a peculiarly grisly account of the fate of one of his silk-weaver patients in Spitalfields. On the strength of this he became a candidate for Fellowship of the Society, his sponsors being Edmund Halley, R. M. Massey (both friends of John Martyn) and Richard Graham, and was duly elected that same November. The Members' List of the Society of Apothecaries for 1738 show his practice still in Spitalfields, where he died the following April. There is a tombstone in Grantham Church commemorating Mary, 'daughter of Vincent Bacon, F.R.S.', died 16.8.1765, aged 27 (Turnor, 1806), which implies a marriage by 1737 at the latest.

THOMAS DALE (*1699 or 1700-1750*) *PHYSICIAN*

An excellent account of Dale by Christy (1919) has been generally overlooked. This reveals that he was the son of a Hoxton apothecary and nephew of the famous Samuel Dale, the apothecary friend and neighbour of Ray. He graduated M.D. at Leyden in September 1723, submitting a thesis on medico-botany, two copies of which are now in the British Museum. In this he names as his patrons or introducers Samuel Dale, William Sherard, Boerhaave, Dillenius and Martyn — the two last reflecting his membership of the Botanical Society, of which the minute-book reveals him as Secretary in 1726. For eight to ten years after taking his degree he practised medicine in London, living apparently in Bishopsgate. An expert linguist, he devoted much of his time at this period to the translation of important medical works from Latin and French into English, an interest which he shared with Martyn and which was doubtless well remunerated by publishers. One of these translations was dedicated to Dr. James Douglas.

In March, 1731/2, his life suddenly changed. Leaving England under a definite cloud—it seems he was in debt and had offended his family by paying court to a lady of whom they disapproved (causing Samuel Dale to cut him out of his will, leaving him only the proverbial shilling)—he sailed to America and settled in Charleston, Carolina. From here, in 1736-37, he sent specimens to his uncle which are now in the British Museum (Natural History).

Various details of this later part of his life have been uncovered by Seibels (1931) and by Waring (1964). Soon after his arrival, in March 1733, he married Mary Brewton, the daughter of a local colonel and one of the wealthiest local citizens. The house which the latter gave to the couple as a wedding present still stands in Charleston and still bears its original name: "Daughterdale". This first wife died in childbirth, however, in 1737. The next year he married Anne Smith and on her death, without issue, in 1743 married yet again, only five months later. This wife, Hannah Simons, bore him three children, the eldest of whom returned to Britain to settle, qualified in medicine, at Edinburgh and became Registrar of the Literary Fund for Impoverished Writers. Dale himself was one of the earliest known writers of verse in America, contributing prologues and epilogues (of appropriate eighteenth-century raciness) to the plays performed at the local theatre—an interesting parallel to Martyn's later activities and suggesting that the proceedings of the Botanical Society may have had a bitingly satirical undertone. In 1734, presumably through the influence of his father-in-law, he was made a Judge in the Supreme Court of South Carolina and served in that capacity till his death. He continued to practise medicine even so, numbering among his patients the Queen of the Catawba Indians. A hot-tempered man, he argued for the methods of tradition with constant fervour, being particularly vehement against inoculation. His obituary refers to 'his great and extensive reading', from which he 'had a great fund to entertain in conversation'. His effects, sold in 1751, included 2,273 books, 325 of them on medicine and botany, as well as 'several very valuable negroes'. In his will he bequeathed his herbarium to the elder Gronovius, a friend presumably from Leyden days; but it is not clear whether it did indeed find its way across the Atlantic into the Gronovius collections, which were sold at Leyden in 1778.

It remains to be added to these accounts that Dale wrote several letters to Philip Miller from Charleston in 1746, one of which is now in the Martyn Correspondence. In this he asks Miller to remember him to Dillenius and to 'pray beg Dr. Martyn to favour me with a botanical correspondence'. There is no evidence that Martyn complied.

GEORGE CHARLES DEERING (*c. 1690-1749*) *PHYSICIAN*

In the case of Deering we are fortunate to have a lengthy fragment of autobiography, which was subsequently published by Nichols (1817).

Of German extraction (his name was originally Dering), he was brought up in Saxony and sent to school at the Gymnasium in Hamburg. From here, in 1708, he went to Leyden, where he attended the lectures in the Physic Garden and studied under Boerhaave—but without proceeding to a degree—and later moved on to Amsterdam to become a pupil of the famous naturalist Ruysch. A Holsatian nobleman then took him round Europe as his companion, and this experience led to his appointment on returning to Hamburg as secretary to Baron Schack, Envoy Extraordinary of the Czar of Russia to Queen Anne. This brought him in April 1713 to London, where he occupied the extensive leisure permitted by the post in chemical experiments and reading English medical books not yet published in other languages. In 1715 he resigned his secretaryship and, deciding to stay on in London, became a private tutor. In November 1718, he married (rather against his better judgment) and spent his honeymoon in Rheims, staying just a month to collect a doctor's degree before moving on to Paris to study midwifery. There he stayed still the next summer, when he 'went the botanical walks about Paris' and attended the lectures of Bernard de Jussieu. Returning again to London in August, he soon after set up in practice in Spitalfields, where he remained for the next seventeen years, specialising in midwifery among the poor. He quickly resumed his botanising and (probably through the Botanical Society) became friendly with his fellow expatriate, Dillenius, with whom he shared an obviously cantankerous temperament and a total want of humour. Several records from the London area, including mosses, stand to his credit in the Dillenian *Synopsis*.

In 1736, on the death of his wife (who had evidently been a great trial to him—he writes of his 'hard struggles . . . through the indiscretion of my yoke-fellow') he decided on a fresh start and moved to Nottingham. After initial success gained by his novel treatment of a smallpox epidemic, his unfortunate temper undermined his practice and, crippled by gout, he eventually died in the uttermost poverty. His *Catalogue of Plants . . . about Nottingham* (1738), one of the earliest British local Floras, was the principal fruit of this final period. The herbarium on which it was based was bought by his patron, the Hon. Rothwell Willughby (a relative of Ray's great friend), but has long since been lost to sight. Many mosses from the Nottingham district were also sent by him to Dillenius.

WALTER TULLIDEPH (*d. 1794*) *SURGEON*

Much is also known about Tullideph thanks to the lucky survival of his letter-books. Although lengthy extracts from these have been printed by Oliver (1899), they have not hitherto been drawn on to any extent for the botanical literature.

A Scot by birth (the surname is Gaelic), Tullideph was educated at the High School, Edinburgh, and subsequently went to France (possibly Rheims) to qualify in medicine. Later he moved to London and at the time of his membership of the Botanical Society was working (according to Martyn, 1770) as amanuensis to Dr. James Douglas, a renowned anatomist who also had a keen interest in plants.

About 1726 he went out to the West Indies at the invitation of a cousin, who owned a sugar plantation in Antigua. Here he practised as a physician and surgeon, and for the next thirteen years sent many botanical specimens to Sloane. In January 1735/6, he married the young widow of a wealthy creole and thereby became the owner of a very substantial estate. Between 1748 and 1754 he became successively a member of the island's Assembly and Council and a lieutenant-colonel in the militia. A son and at least three daughters were born to him, and it was to bring one of the latter to school in Chelsea (where perhaps he looked up his old friend Martyn) that in 1751 he made the first of several visits home.

In 1758 he returned to Britain to settle, buying a £6,000 estate at Dundee, which he named Tullideph Hall. An elder brother, a professor of divinity, had been Principal of the nearby College of St. Andrews for some years. In 1763, perhaps out of boredom, he started a business in Dundee. He eventually died at what was clearly a great age and, as his will discloses, in considerable affluence. Whether he made contributions to the botany of Angus in these later years is not known.

JOHN WILMER (*1697-1796*) *APOTHECARY*

Some useful additional details about Wilmer, hitherto overlooked, appear in an exhaustive genealogical account by Foster & Green (1888).

Wilmer was baptised and brought up at Ellesborough, near Wendover, in Buckinghamshire, where his father, an Oxford graduate, was rector. (His grandfather was a lawyer of the Inner Temple who inherited a number of houses in the parish of St. Botolph without Aldersgate). In September 1712 he was apprenticed in the Society of Apothecaries to his cousin Henry Prockler, with whom he resided while in London, and probably developed a passion for botany and entomology a year or two later through attending the Society's excursions. It was he who introduced the nineteen year-old Martyn to botany in June 1718. He seems to have spent much of his summers out at Ellesborough and several early Buckinghamshire records made by him lie in the Martyn Correspondence apparently still unpublished. In September 1719 he visited Oxford and looked up the younger Bobart, finding him helpless. 'We had a great deal of talk', he wrote to Martyn, 'and I saw his collection of plants, insects, fossils, etc.

. . . He gave his service to all our botanical aquaintance in which you are included'. In the spring of 1720 he was still marooned, for some reason, out at Ellesborough and invited Martyn to make use of his vasculum and other botanical equipment.

By 1722 he was in business as an apothecary in London, in Bishopsgate Street. A few records made at this period appear in the Dillenian *Synopsis*. His botany evidently took him quite far afield, for there is a *Gentianella* of his in Herb. Sherard from near Beaconsfield, while Martyn (1732) credits him with a *Clavaria* from Marlborough Downs. In 1735 he appears as the donor of two books to the library of the Chelsea Garden, and the close association with the Apothecaries' botanical activities that this seems to imply was rewarded by his election in 1741 to the Garden Committee, at whose meetings he was an assidous attender for the next three years.

About 1745 he ceased to practise as an apothecary, abruptly and mysteriously, and moved out to Cowley, near Uxbridge. Here he remained about three years, evidently botanising a great deal, for many records of his from the Cowley district are cited by Blackstone (1746).

In April 1748 his appointment as Demonstrator of plants, an 'onerous and exacting' office, by the Society of Apothecaries, in succession to Joseph Miller, caused his removal to Mealman's Row in Chelsea and, as a matter of course, his reappearance on the Garden Committee, on which he was to remain till 1758. The following summer he catalogued the Garden library and was presumably responsible, in his official capacity, for a notable *faux pas* in hiring a band for the Society's barge on the occasion of the General Herbarizing (Wall, Cameron & Underwood, 1963). In August of that year he first appears as 'Dr.' Wilmer, and it may be that the years at Cowley were devoted to acquiring a medical degree—certainly, in a communication to the Royal Society in 1755 his name is followed by the letters M.D. His position at the Garden carried mainly prestige (the salary was only £30 a year) and he supplemented this by practising as a physician.

He finally relinquished direction of the Garden in October 1764 and retired to live in Dartmouth Street, Westminster, probably with the niece to whom most of his property was bequeathed. He had no children by his wife, a Miss Skelton, who predeceased him and was buried (as he too asked to be) by the north door of Westminster Abbey. In his will he left £100 to the Society of Apothecaries and his botanical books, a gold watch and some folios of plants painted by Philip Miller to Stanesby Alchorne, another leading apothecary. A herbarium which he donated to the Garden is believed to have been destroyed about a century later.

The next twelve members have not previously been identified as British botanists.

J. CHANDLER *(1700-1780)* *APOTHECARY*

Son of the minister of a presbyterian congregation at Bath, and born probably at Bath or Hungerford, John Chandler was apprenticed in the Society of Apothecaries to James Siddall in April 1716, gaining his freedom in January 1724. A brother, Samuel Chandler, D.D., F.R.S., F.S.A., a noted preacher and controversialist, and a sister, Mary, authoress of a volume of poems that went into eight editions, also feature in the *Dictionary of National Biography.* Their brother John is briefly mentioned in this work as the author of *A Discourse concerning the Smallpox* (1729), which doubtless procured his election to the Royal Society in February 1734/5, and *A Treatise on the Disease called a Cold* (1761), in which he gave the credit to Letherland (his one-time fellow member of the Botanical Society) for first drawing attention to the disease now recognised as diphtheria. After practising in Lothbury, he became a partner in 1741 in the firm of Smith & Newsom, in King Street, off Cheapside, where he remained for the rest of his working life. His interest in botany was evidently kept up, for in May 1759 he was elected to the Committee of the Chelsea Garden, on which he served for many years. In this capacity he played a leading part in the famous skirmish between the Committee and its unco-operative Gardener, Miller. In 1767, perhaps partly in recognition of his many services to its Garden, the Society of Apothecaries elected him Master. His children became closely involved with St. Thomas's Hospital, his son becoming the senior surgeon there and his daughter marrying the Treasurer.

JOSEPH FORSITT *(fl. 1702-1763)* *APOTHECARY*

Forsitt was apprenticed in the Society of Apothecaries in May 1716, almost simultaneously with Chandler and Latham. His master was Joseph Cruttenden, who himself appears to have had botanical leanings and, like John Field, was possibly given to nudging promising apprentices in this direction. After obtaining his Freedom in December 1725, he practised at a variety of addresses in London, the last known being in Great Carter Lane, where he remained from 1748 till 1763, if not later.

ROBERT FYSHER, M.B. (*1698-1747*) *PHYSICIAN* (never practised)

The sixth son of a Lincolnshire squire, whose family seat was Grantham Grange, Fysher went up to Christ Church, Oxford, his uncle's old college (Salter, 1921), at the age of sixteen, graduating B.A. in 1718, M.A. in 1724 and B.Med. in 1725. His elder brother, Francis, who inherited the family estate, was M.P. for Grantham in 1722-27; an uncle was at the Bar, and a niece married the grandson of Ray's friend Willughby (Maddison, 1902). It was doubtless while up to study at the London hospitals, in preparation for his medical degree, that he became involved with the Botanical Society—possibly introduced by Bacon, whom he must surely have known back in Grantham. Three records made by him round London at this time were sufficiently noteworthy to find their way into print: *Erodium moschatum* (L.) L'Hérit. near Battersea — the first record for Surrey — *Damasonium alisma* Mill. at Stoke Newington (both in the Dillenian *Synopsis*) and *Anagallis foemina* Mill. near Peckham (Martyn, 1732).

At Easter, 1723, he was elected to a Fellowship at Oriel College, Oxford, by examination—indicative of great ability—and retained this for the rest of his life, thereby precluding his marrying. Gilbert White, author of *The Natural History of Selborne*, also became a Fellow, and later Dean, of Oriel and the two must have known each other, possibly quite well. In December 1729, the post of chief librarian at the Bodleian having fallen vacant, Fysher was the candidate of the Tory party and proved unexpectedly victorious by 100 votes to 85. Thomas Hearne, gloating over the victory in his diary, calls him 'by much the worthier man, as far as I can yet learn' (Macray, 1890; Salter, 1915). Little is known about his work at the Bodleian except that he was responsible for issuing the 1738 catalogue, which was held in high repute for its minute and abundant cross-references. His work was much impeded by ill-health and he died compartively young, while on a visit to Sevenhampton, in Wiltshire. Part of his coin collection was left to the Bodleian (Macray, 1890). Whether he possessed a herbarium is unknown.

JOSEPH HARRIS (*b. 1704*)	*SURGEON-APOTHECARY*
THOMAS HARRIS (*b. 1708/9*)	*SURGEON-APOTHECARY*
SAMUEL HARRIS (*b. 1710*)	*SURGEON-APOTHECARY*

The apprenticeship records confirm the inevitable suspicion that the three members named Harris were in fact brothers. Their father, John Harris, was a surgeon in Lambeth Street, in the parish of St. Mary, Whitechapel, and also had an apothecary business in Goodman's Fields, nearby, until at least 1738. (He is doubtless the John Harris to whom Plate 8 in the third decade of Martyn's *Historia Plantarum Rariorum* (1728-37) is dedicated). The baptismal register of St. Mary, Whitechapel (now at County Hall), provides the dates of birth. All three were apprenticed to their father, in both the Apothecaries and Surgeons Companies, in 1718-19, 1722-24 and 1725-27 respectively, but only Thomas (in the Surgeons Company, 1731-2) acquired the Freedom of either.

Only Joseph appears in the list of members given by Martyn (1770), which suggests that he joined a good year or two before his brothers. He is also the only one to whom specimens are unambigously credited in herbaria — four gathering from the London area, including a moss and a fungus, in the Dillenian *Synopsis* herbarium (Druce & Vines, 1907, pp. 17, 36, 80, 156) and others in Herb. Sherard (Clokie, 1964), all at Oxford. Three unlocalised gatherings attributed to 'Mr. Harris' in Herb. Martyn at Cambridge, apparently received after 1729, are also doubtless his. He must also be the 'Mr. Harris' mentioned several times in the Society's minute-book, especially as co-author of the still partially unpublished list of plants found on a walk from London to Dulwich with Rand in August, 1725—carelessly misattributed by Thomas Martyn (1763) to Samuel Harris, whose age, now established as fifteen, would make this in any case rather unlikely. The identification with the Harris to whom Scheuchzer (1723) dedicated a plate, suggested by Clokie (1964), is certainly erroneous.

None of the three subsequently practised as London apothecaries (a Thomas Harris who appears in the Apothecaries' lists is not the same person) and their later history remains unknown.

SAMUEL HORSMAN, M.D. *(1698-1751)* *PHYSICIAN*

A native of Middlesex, Horsman studied medicine at Leyden, graduating M.D. in October, 1721. His thesis, now in the library of the Royal Society of Medicine, is dedicated to his uncle, a lawyer in Lincoln's Inn. In 1728 he received a Cambridge M.D. by decree and in September 1737 won election to the College of Physicians, of which he acted as Treasurer from 1746 till his death. He practised, like Christopher Merrett before him, in Hatton Garden. His sole published botanical contribution appears to have been the first British record of the lichen *Cladonia sobolifera* Del., collected on Hampstead Heath and given to Dillenius for inclusion in the *Synopsis* of 1724 (Druce & Vines, 1907, p. 30).

SAMUEL LATHAM *(fl. 1716-1760)* *APOTHECARY*

Apprenticed in the Society of Apothecaries in July 1716, becoming a Freeman in March 1724, Latham was fortunate to have as his master John Field, of the Bell in Newgate Street, the botanical friend of Joseph Andrews and John Blackstone. He subsequently practised in Newgate Street, presumably as Field's junior partner, at least until 1752. A brief appearance on the Committee of the Chelsea Garden, in May 1760, was not repeated; but he was doubtless the person of this name elected Master of the Apothecaries for the year 1768-69 in immediate succession to Chandler.

J. LETHERLAND, M.D. *(1699-1764)* *PHYSICIAN*

Born in Stratford-on-Avon, the son of a prebyterian minister, Joseph Letherland had come to London by 1719, probably to attend medical lectures, and there became a special botanical friend of Wilmer and Martyn. In September 1722 he went to Leyden to read medicine and graduated M.D. there in July 1724. A Cambridge M.D. by decree followed in 1736 and in the next year he was elected to the College of Physicians. For the last forty years of his life he practised in London, in Aldermanbury. Additionally he was appointed Physician to St. Thomas's Hospital in 1736 and to the Queen in 1761. Bishop Warburton in 1763 rated him and his friend Dr. William Heberden the two best physicians in Europe. Although retiring and little known even in his profession, he was highly regarded for his immense learning and formed a notable collection of ancient manuscripts.

JOHN PAYNE (*fl. 1707-1718?*)
'APOTHECARY IN LONDON' (Martyn, 1763)

There were no less than four persons of this name in the Society of Apothecaries at this period, perhaps all related. The member of the Botanical Society was most probably the one apprenticed in May 1707 to John Bernard and later turned over to Bartholomew Shorthose, gaining his Freedom in December 1718. The Apothecaries' membership lists have unfortunately not all survived, but he may well be the John Payne who appears in 1736 and subsequent years without any business address appended —perhaps indicating that he merely assisted his father. He may conceivably have been the 'Mr. Pain' who contributed a specimen of *Filago gallica* L. from near Dartford in 1739 to Herb. Rand (Hanbury & Marshall, 1899).

A John Payne whose herbarium is listed in Kent (1958) turns out, on investigation, never to have existed: the entry is an error for John Bateman (Allen, 1966B), whose *hortus siccus* is the only one of this period in the possession of the Pharmaceutical Society of Great Britain.

T. RICHMOND (the initial is misprinted as 'J' in Edwards, 1963) (*1695-1758*)
PHYSICIAN?

There was no one of this name at this period in either the Apothecaries or Surgeons Companies. Thomas Martyn (1770), however, includes in a list of his father's correspondents 'Dr. Richmond of Burton, near Wootton Bassett, Wilts.' Burton is a slip for Purton, a village four miles from Swindon. A branch of a prominent North Wiltshire family called Richmond had long been settled at Chadderton, near Purton, and the owner of the estate at this time was a certain Toby Richmond, whose youngest son Thomas followed his two brothers to Balliol College, Oxford, in January 1711/2. The Oxford records imply that the father moved to Marlborough between 1707 and 1711; but if so, the family evidently retained lands at Purton, for Toby Richmond features as an owner there in a perambulation record of 1733 (Maskelyne, 1918).

After graduating B.A. in 1715, Thomas Richmond went down in the summer of the following year, only to enter St. John's College, Cambridge, in 1722. His membership of the Botanical Society suggests he subsequently moved to London to study medicine, but no record can be traced of his having obtained an M.D. He appears to have returned to live in Wiltshire and died unmarried, without leaving a will.

MR. WITHERS (*fl. 1708-1736*) *APOTHECARY*

A person of this name who exhibited a fungus to the Society in 1726 can only be William Withers, a senior member of the Society of Apothecaries who became Master in 1732. One of the subscribers to the fund for improving the Chelsea Garden in 1708, he was also on the Garden Committee in 1734. He died in 1736 or 1737.

Finally, the two members who cannot be identified:

MR. BEDFORD

From his general background this could well have been William Bedford (b. 1700 or 1701), eldest son of the Rev. Hilkiah Bedford, an eminent Quaker antiquary who after being deprived of his Fellowship at St. John's College, Cambridge, ran a boarding-house for boys attending Westminster School. William Bedford went up to St. John's in May 1722 (and so would have known Thomas Richmond), but left without taking a degree, insisting, although brought up in the Church of England, on being a non-juror like his father. He went to Leyden to study medicine in September 1727—which would accord well with membership of the Botanical Society in the autumn of 1726—but family difficulties prevented his finishing the course. He eventually acquired a Cambridge M.D. by royal mandate, was elected to the Royal Society and became Registrar of the College of Physicians and Physician to Christ's Hospital. He had an extensive knowledge of languages and was sufficiently reputable a scholar to be left a vast collection of valuable books and manuscripts by the great antiquary Thomas Hearne.

DR. HALL

This might be Abraham Hall, who graduated M.B. at Cambridge in 1725 and M.D. in 1728. He was later appointed Physician to both St. Thomas's Hospital (like Letherland) and the Charterhouse, dying in 1751.

Another possibility is Francis Hall, a physician who went out to Buenos Aires about 1728 to treat the negro slaves on their disembarkation from Africa. From here he sent back botanical specimens to both Sherard and Sloane.

Thomas Martyn (1763) also lists a Henry Hall as one of the botanists of this period who left no published work to their name.

The surname is unfortunately so common that identification is unlikely in the absence of additional details.

We cannot be sure that this was, in fact, the sum total of the members. Certainly there were other botanists in London in these years who might well have been expected to belong. Most notable absentees are the two apothecaries, Joseph Miller (d. 1748), whose *Botanicum Officinale* was indeed published at this very time, in 1722, and Robert Nicholls (fl. 1713-1750), whose appearance as a subscriber to Albin's *Natural History of English Insects* (1720) shows his interest in natural history had already begun. The two famous horticulturalists Thomas Fairchild (1667?-1729), a particular friend of Martyn and Wilmer, and Thomas Knowlton (1692-1782) perhaps regarded the Society as too learned and medical in its leanings. And doubtless Dr. James Douglas (1675-1742), the eminent anatomist, was altogether too busy to manage to attend the meetings.

Social Composition

From an analysis of the members' biographies a considerably fuller picture of the Society's general character can now be discerned.

First of all, it was an extremely youthful body. Of those whose age can be established with more or less precision, all but six were under twenty-five in 1721. Even Miller was only thirty, and the only two verging on middle age, Rand and Withers, evidently preferred to remain in the background.

Secondly, it was very much a medico-botanical society, with a strongly vocational impetus. Of the members identified, one-third were apothecaries, one-third physicians, and most of the rest surgeons or surgeon-apothecaries.

The social backgrounds of the members, in so far as these are known, strengthen this professional flavour. Wilmer, Chandler, Letherland and perhaps also Bacon and Bedford were sons of clergymen—significantly Dissenters as often as Anglican priests, presaging the vital role in higher education soon to be played by the dissenting academies. Dale, Rand and the Harris brothers followed fathers who were medical men already, Fysher and Horsman both had uncles at the Bar, while Richmond and Fysher exemplified the growing tradition for the landed gentry to place their younger sons in the learned professions. If we exclude Miller, the gardener son of a gardener, only Martyn himself, as the son of a wealthy merchant, stands out as a social oddity—and even he had a great-grandfather who had been at Cambridge. All in all, the members and their immediate families form a fine cross-section of the intellectual middle class at this period, the teaching profession alone being under-represented—though Deering had lately been a tutor and Tullideph's brother was to become a professor.

With few exceptions, as their subsequent careers show, the members were far above average in intellectual vigour; and the vague image of a bunch of enthusiastic but probably semi-lettered youths, which up to now is what, by default, we have been led to form, is clearly a long way from the true reality. Moreover, their social standing was for the most part considerable—well above that of the contemporary Society of Gardeners (1730) or of the entomologists who apparently constituted the Aurelian Society (Allen, 1966A), with neither of which, apart from Miller, did the Botanical Society share any members in common. The leavening of physicians, in particular, underlines this, for their university education carried them into higher reaches of society than could normally be achieved by the relatively unglamorous apothecaries. And at least four of them, it is worth noting, studied under Boerhaave at Leyden, which was the most fashionable start to a medical career then obtainable.

The Ending

Why and when the Society came to an end remains obscure. The surviving minute-book shows it still in an apparently flourishing state at the end of 1726, and we have only Thomas Martyn's unreliable assertion that it continued no longer. Several of the original members, it is true, had left London by then and others must have found themselves too preoccupied with the working up of businesses or practices. But the gaps they left could surely have been filled without much difficulty from each year's new crop of apprentices.

The real destroyer of the Society was, quite possibly—and paradoxically—its creator: John Martyn himself. Shortly after its birth he had delivered a series of lectures to the members, explaining the technical words used in botanical science. Having thus uncovered an unsuspected didactic vein, he went on to give private courses in botany in 1725 and 1726, evidently as a kind of crammer for students of physic, there being hardly any regular medical schools in London at this period. These courses appear to have included field classes in the summer, and the excursion to Sheppey by Martyn, Bacon, Thomas Harris and Bedford in September 1726, of which an account was given to the Society, may well have been one of them. It is hard to escape the impression that Martyn regarded the Society as very much his personal fief and fell into the not uncommon trap of identifying its activities too closely with his own. Perhaps, therefore, the pangs of resentment that his lecturing seems to have aroused are no great cause for surprise. In May 1725, having evidently complained to Blair of attempts to hinder his teaching, he received a soothing letter back: "I'm not much surprised but heartily regret the malice and envy you have so innocently drawn upon you . . . .'—and was urged to go ahead regardless. It was shortly after this that a successor to Dillenius was being sought for the Presidency. He, for one, might well have been irritated by Martyn's presumption in teaching botany professionally without qualifications of any kind.

Nevertheless Martyn's teaching must have been lively and effective, for in 1727 he was invited to Cambridge 'by above twenty scholars' (Turner, 1835, p. 269) to give a series of lectures in the anatomy school. Possibly his friend Richmond, of St. John's College, was one of the inviters. He was officially recommended by Sloane and Sherard, but this was doubtless a mere formality.

The then Professor of Botany at Cambridge was Richard Bradley, a leading horticultural journalist, who owed his appointment to the egregious Dr. Bentley, the Master of Trinity and the most detested man in the University. It could well have been a faction of Bentley's enemies who arranged the invitation to Martyn, as a roundabout way of scoring a useful point politically. Bradley himself has been much vilified, mainly by the Martyns, whose motives must be suspect (Williamson, 1961); and certainly his numerous writings show considerable knowledge and ability (Roberts, 1939). By 1720, well before his appointment to the Chair, his reputation was sufficiently impressive for news of it to have reached Boerhaave in Holland, one of his admirers being no less capable a judge than Rand (Lindeboom, 1962). A manuscript volume containing twelve of Bradley's original lectures, evidently delivered early in 1725, still survives at the Botany School, Cambridge. They deal with the principles on which the arts of husbandry and gardening ought to be based—not, as one might perhaps have expected, with methods for identifying *materia medica.* Bradley, it seems, was an ardent experimentalist, way before his time: he had little inclination for, or learning in, the classical taxonomy which at that period formed the staple for students of medicine and which, we may suppose, was the particular *forte* of John Martyn (Hamshaw Thomas, 1937). Starved of the facts they had doubtless come along to gather purely in order to pass their exams, his audiences must have grown, at the least, a trifle restive. As a platform personality, too, he may have been at best uninspiring—at least in comparison with Martyn, to whose powers of wit and gusto the pages of the scurrilous *Grub-street Journal,* which (for some mysterious reason) he helped to edit, bear ample testimony.

On Bradley's death in 1732 Martyn obtained his title of Professor—but not without some effort behind the scenes, for although there were no official emoluments the post conferred great prestige and afforded its holder the chance of a substantial income from addressing the public. In later years he even introduced the novelty of taking his botany students on field excursions, 'shewing them the Cambridgeshire plants where Mr. Ray had described them to grow' (Walker, 1763).

Thus, although the Botanical Society, with the transfer of Martyn's energies elsewhere, now apparently came to an end, it can be said to have fertilised the first teaching of botany at Cambridge, in several valuable ways. Without its existence Martyn might never have found his interest in lecturing, or even attracted attention. And without his experience of the field tradition of the Apothecaries and the enormous value of their Chelsea Garden in giving practical instruction, he might never have pressed so hard for a similar garden at Cambridge. Although he failed in this aim himself, in 1731, others were to succeed some thirty years later—securing as first Curator the son of Philip Miller. Thus, in the course of time, Cambridge botany became doubly the offspring of Chelsea.

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A SPECIES-LIST OF FLOWERING PLANTS AND FERNS FOR THE MOOR HOUSE NATIONAL NATURE RESERVE IN UPPER TEESDALE

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The Moor House National Nature Reserve covers 9,500 acres in the north-east corner of Westmorland (v.c. 69), with altitude ranging from 1000 to 2780 ft. A full description of the vegetation is given by Eddy, Welch and Rawes (in preparation); suffice it to say here that much of the Reserve is covered by blanket peat, but some grasslands occur, especially along the Pennine ridge, which traverses the area from N.W. to S.E., and on its steep western escarpment. The underlying rocks are a cyclical succession of limestones, sandstones and shales, belonging to the Yoredale Series of the Carboniferous, but are obscured, except on steep slopes and in water courses, by a thick layer of glacial drift.

About 270 species have been recorded; many of them are confined to limestone grassland, or to calcareous springs and flushes emerging below limestone. Although the area is much less rich botanically than Widdybank and Cronkley Fells which lie a further four miles down the Tees, there being no sugar limestone on the Reserve, it has more than its share of interesting and scarce species when compared with similarly sized upland areas. The paucity of the flora is caused partly by the absence of ruderal, woodland and aquatic species.

In the following list the description of the habitat is normally by English physiognomic naming, but where greater precision has been thought desirable the Latin vegetation units described in Eddy, Welch and Rawes have been used. 'Calcareous grassland' includes both dry limestone grassland and wet calcareous flushes, whilst 'base-rich grassland' includes additionally alluvial grasslands. The lower levels are those below 1600 ft., the higher those above 2000 ft. The nomenclature and species numbering is based on that of Dandy (1958). Additional records for v.c. 69 to those in an annotated copy of the *Comital Flora* (Druce, 1932) are marked §; if previously recorded elsewhere an asterisk is added, and the source given. Species not recorded in the *Comital Flora* (Druce, 1932) are marked †.

1/1 *Lycopodium selago* L. Rare on blanket bog, occasional in crevices of sandstone rocks.

1/5 *L. alpinum* L. Rare and sporadic in high-level *Festuca* grassland, and on mine-heaps from disused lead mines.

2/1 *Selaginella selaginoides* (L.) Link Frequent in grassland.

4/5 *Equisetum fluviatile* L. Common in pools especially within old mine shafts and levels.

4/6 *E. palustre* L. Frequent in wet calcareous grassland.

4/7 *E. sylvaticum* L. Single locality on sandstone ledges (Force Burn waterfall).

4/9 *E. arvense* L. Present near Moor House and on sandstone ledges in Swindale.

8/1 *Pteridium aquilinum* (L.) Kuhn Confined to dry acidic soils below 1500 ft.

9/1 *Cryptogramma crispa* (L.) R. Br. ex Hook. Frequent in sandstone scree.

13/1 *Blechnum spicant* (L.) Roth Occasional on acid drift and rocks.

14/1 *Phyllitis scolopendrium* (L.) Newm. Rare on limestone rocks (Knock Ore Gill; Green Burn mine shaft).

15/5 *Asplenium trichomanes* L. Occasional on rock, especially at the lower levels.

15/6 *A. viride* Huds. Common on limestone.

15/7 *A. ruta-muraria* L. Occasional on rocks.

18/1 *Athyrium filix-femina* (L.) Roth Occasional on shaded rocks

19/1 *Cystopteris fragilis* (L.) Bernh. Common on limestone.

21/1 *Dryopteris filix-mas* (L.) Schott Occasional on rocks, chiefly limestone.

†21/3 *D. abbreviata* (DC.) Newm. Occasional in high-level sandstone scree.

21/6 *D. carthusiana* (Villar) H. P. Fuchs Frequent in shady places amongst rocks and occasional on blanket peat.

21/7 *D. dilatata* (Hoffm.) A. Gray Frequent on rocks.

†(21/a *D. assimilis* S. Walker Recorded by A. C. Jermy in sandstone scree in Knock Ore Gill, and probably occurs elsewhere on the Reserve).

22/2 *Polystichum aculeatum* (L.) Roth Occasional on limestone.

22/3 *P. lonchitis* (L.) Roth Rare in limestone scree and sinkholes.

24/1 *Thelypteris limbosperma* (All.) H. P. Fuchs Occasional in acidic grassland at the lower levels, and on sandstone.

24/3 *T. phegopteris* (L.) Slosson Single locality on whinsill (Force Burn Gorge).

24/4 *T. dryopteris* (L.) Slosson Rare on sandstone (Force Burn waterfall; scree in Knock Ore Gill).

25/1 *Polypodium vulgare* L. *sensu lato* Occasional on sandstone and whinsill.

28/1 *Botrychium lunaria* (L.) Sw. Occasional in grassland, especially on mine-heaps.

29/1 *Ophioglossum vulgatum* L. Rare, on a mine-heap, and in flushed *Nardetum* in the Moor House area.

34/1 *Juniperus communis* L. Three bushes at 1500 ft. on limestone in Swindale.

36/1 *Caltha palustris* L. Frequent in wet places with subsp. *minor* frequent at the higher levels.

43/1 *Anemone nemorosa* L. Little seen, but present occasionally in limestone grassland.

46/1 *Ranunculus acris* L.
46/2 *R. repens* L. Common in their usual habitats.
46/12 *R. flammula* L.

46/16 *R. hederaceus* L. Rare (rill at head of Middle Tongue Beck).

46/17 *R. omiophyllus* Ten. Occasional in pools and springs.

46/24 *R. ficaria* L. Occasional in grassland and *Pteridetum* at the lowest levels.

50/2 *Thalictrum alpinum* L. Very rare on limestone rocks (Knock Ore Gill at 2450 ft. as given by Wilson (1938)) and in a calcareous flush (Trout Beck Head).

50/3a *T. minus* L. subsp. *minus* Rare on limestone rocks (Swindale at 1600 ft.).

84/4 *Thlaspi alpestre* L. Common around lead mine workings.

85/1 *Teesdalia nudicaulis* (L.) R. Br. Not seen recently, but a single plant at the source of the Tees (*Vasculum,* 1915).

86/1 *Capsella bursa-pastoris* (L.) Medic. In garden at Moor House.

88/2 *Cochlearia alpina* (Bab.) H. C. Wats. Common on limestone and around mine workings, occasional in flushes.

94/3 *Draba incana* L. Occasional on limestone ledges (Green Castle; Middle Tongue Beck; Greatdale).

§*95/1 *Erophila verna* (L.) Chevall. Rare (on a limestone boulder at 1400 ft. N. of Radar Road). Rather common in v.c. 69, according to Wilson (1938).

97/1 *Cardamine pratensis* L. Common in their usual
97/4 *C. flexuosa* With. habitats.

100/4 *Arabis hirsuta* (L.) Scop. Frequent on rock ledges on the western escarpment of the Reserve.

102/1 *Nasturtium officinale* R.Br. Single locality by the stream draining the Moor House meadow.

113/4 *Viola riviniana* Reichb. Common in their usual
113/9 *V. palustris* L. habitats.

113/11 *V. lutea* Huds. Frequent in base-rich grassland.

114/2 *Polygala serpyllifolia* Hose Common in grassland.

115/11 *Hypericum pulchrum* L. On whinsill scree in a single locality (Force Burn Gorge).

131/7 *Cerastium bontanum* Baumg. subsp. *triviale* (Murb.) Jalas Common in base-rich grassland.

133/2 *Stellaria media* (L.) Vill. Only recorded from disturbed ground around Moor House and the cattle grid on the Radar Road.

133/7 *S. graminea* L. In limestone and alluvial grassland.

133/8 *S. alsine* Grimm Frequent in *Juncetum effusi.*

136/4 *Sagina procumbens* L. Frequent in base-rich grassland.

136/10 *S. nodosa* (L.) Fenzl Occasional in flushes and wet grassland.

137/1 *Minuartia verna* (L.) Hiern Frequent in limestone grassland, common on lead-mine heaps.

141/1 *Arenaria serpyllifolia* L. On fell-wall at the western foot of the area.

149/1 *Montia fontana* L. Common in springs.

166/4 *Linum catharticum* L. Frequent in calcareous grassland.

168/2 *Geranium sylvaticum* L. Occasional in limestone grassland, especially on ungrazed ledges, and in the Moor House meadow.

168/15 *G. lucidum* L. Rare in limestone scree (S. of Knock Ore Gill; Eller Gill near fell-wall).

168/16 *G. robertianum* L. Frequent amongst limestone rocks.

170/1 *Oxalis acetosella* L. Common in grassland and rocky places.

192/2 *Trifolium pratense* L. Confined to the Moor House meadow.

192/18 *T. repens* L. Common in grassland.

195/1 *Lotus corniculatus* L. Occasional in limestone grassland especially at the lower levels.

195/3 *L. uliginosus* Schkuhr Confined to *Juncus acutiflorus* flushes (Middle Tongue Beck Foot).

206/11 *Vicia sepium* L. Occasional on ungrazed limestone ledges.

210/2 *Filipendula ulmaria* (L.) Maxim. In a few flushes (Moss Burn Flush).

211/1 *Rubus chamaemorus* L. Common on blanket bog.

211/2 *R. saxatilis* L. Rare in limestone sinkholes (Knock Fell; Green Burn Head).

212/2 *Potentilla palustris* (L.) Scop. Rare in flushes at the lower levels near Little Dodgen Pot Sike Foot).

212/3 *P. sterilis* (L.) Garcke In grassland, chiefly at the lower levels.

212/13 *P. erecta* (L.) Räusch. Common in grassland.

215/1 *Fragaria vesca* L. Occasional in base-rich grassland and amongst limestone.

216/3 *Geum rivale* L. Occasional in flushes and limestone grassland, especially where ungrazed.

220/3(3) *A. filicaulis* Buser Occasional in calcareous grassland. *Alchemilla filicaulis* subsp. *vestita* (Buser) M. E. Bradshaw Frequent in calcareous grassland.

220/3(8) *A. xanthochlora* Rothm. Only in Moor House meadow.

220/3(10) *A. glabra* Neygenf. Common on limestone and sandstone ledges, and in calcareous grassland.

220/3(11) *A. wichurae* (Buser) Stefanss. Occasional on limestone and whinsill (Middle Tongue Beck; Greatdale).

225/13 *Rosa villosa* L. Rare on limestone ledges (S. of Knock Ore Gill at 1450 ft.; Swindale).

226/1 *Prunus spinosa* L. Only on a limestone scarp (N. of Knock Ore Gill at 1400 ft).

229/2 *Crataegus monogyna* Jacq. Occasional on limestone ledges below 1600 ft. (Knock Ore Gill; Swindale).

232/1 *Sorbus aucuparia* L. About 25 trees and bushes on limestone scarps in Knock Ore Gill and Swindale.

235/1 *Sedum rosea* (L.) Scop. Limestone ledges (abundant on Green Castle; also in Greatdale).

235/8 *S. acre* L. Rare on limestone (Scar Limestone in Greatdale).

235/12 *S. villosum* L. Frequent in flushes and occasional in alluvial grassland.

239/2 *Saxifraga stellaris* L. Common in flushes.

239/3 *S. hirculus* L. Occasional in flushes, often amongst *Juncus effusus.*

239/15 *S. hypnoides* L. Frequent in limestone grassland, especially in rocky places.

242/1 *Chrysosplenium oppositifolium* L. Common in springs and wet limestone crevices.

242/2 *C. alternifolium* L. Occasional in similar localities to the above.

243/1 *Parnassia palustris* L. Occasional in wet calcareous grassland, mainly at the lower levels of the western escarpment.

247/1 *Drosera rotundifolia* L. Frequent in wet bog (*Trichophoro-Eriophoretum*).

254/3 *Epilobium montanum* L. Occasional in limestone sinkholes and on wet ledges.

254/10 *E. palustre* L. Occasional in wet grassland at the lower levels.

254/11 *E. anagallidifolium* Lam. Frequent in high-level
E. alsinifolium Vill. Occasional in high-level flushes
254/12 and on wet limestone ledges.
flushes.

†254/13 *E. nerterioides* Cunn. Common on shingle.

255/1 *E. angustifolium* L. Occasional on shingle and peat.

258/3 *Circaea alpina* L. Rare in limestone sinkholes (Knock Fell).

262/1 *Callitriche stagnalis* Scop. } Frequent in pools.
†262/4 *C. hamulata* Kutz. ex Kah

268/1 *Hedera helix* L. Occasional on limestone, especially at lower levels.

274/2 *Anthriscus sylvestris* (L.) Hoffm. Rare on limestone ledges (Middle Tongue Beck), also on waste ground by Moor House.

293/1 *Conopodium majus* (Gouan) Loret Occasional in limestone grassland.

†294/1 *Pimpinella saxifraga* L. Occasional on limestone ledges (between 1500 ft. and 1600 ft. in Swindale).

307/1 *Angelica sylvestris* L. Rare on limestone ledges (Greatdale; Middle Tongue Beck).

311/1 *Heracleum sphondylium* L. Occasional on limestone ledges, some plants in the Moor House meadow.

318/1 *Mercurialis perennis* L. Single locality by a *Corylus* bush (Knock Ore Gill Foot).

320/1 *Polygonum aviculare* L. Occasional in flushes, especially at lower levels.

320/5 *P. viviparum* L. Occasional in calcareous grassland, but rarely flowering because of sheep grazing.

325/1 *Rumex acetosella* L. Common in grassland.

325/2 *R. acetosa* L. Occasional in grassland, chiefly ungrazed.

328/2 *Urtica dioica* L. Frequent around buildings and in limestone sinkholes.

338/1 *Corylus avellana* L. Rare on limestone scarps at low levels (Knock Ore Gill; Swindale).

343/13 *Salix aurita* L. Single locality in a limestone sinkhole (Knock Fell).

356/1 *Calluna vulgaris* (L.) Hull Abundant below 2200 ft. on east side of Reserve, almost absent on W. because of grazing.

357/1 *Erica tetralix* L. Frequent in heather blanket bog.

358/1 *Vaccinium vitis-idaea* L. Frequent in blanket bog, also on sandstone rocks.

358/2 *V. myrtillus* L. Common in bog and acidic grassland.

358/4 *V. oxycoccus* L. Occasional in wet bog (*Trichophoro-Eriophoretum*).

364/1 *Empetrum nigrum* L. Common in blanket bog, occasional in acidic grassland.

367/1 *Primula farinosa* L. Single locality on wet limestone ledges (Rough Sike Gorge).

367/3 *P. veris* L. Single locality in Moor House meadow.

370/1 *Lysimachia nemorum* L. Occasional in wet places.

385/1 *Gentianella campestris* (L.) Börner Single locality on skeletal limestone soil with *Sesleria* (Knock Ore Gill).

385/3 *G. amarella* (L.) Börner Occasional in limestone grassland (Quarry above Knock Ore Gill; Rough Sike Ford near Moor House).

386/1 *Menyanthes trifoliata* L. Rare in acidic flushes and pools (S.E. of Tees Bridge; Little Dodgen Pot Sike Foot).

388/1 *Polemonium caeruleum* L. An old record for a limestone sinkhole has not recently been re-found (*Phytologist*, **1**, 741).

400/2 *Myosotis secunda* A. Murr. Occasional by streams at the lower levels.

400/3 *M. stolonifera* Gay (*M. brevifolia* C. E. Salmon) Frequent by rills and in flushes at higher levels.

400/6 *M. alpestris* Schmidt Very rare in limestone grassland.

400/8 *M. arvensis* (L.) Hill Single locality by the Moor House meadow wall.

429/1 *Digitalis purpurea* L. Occasional amongst sandstone and whinsill rocks.

430/1 *Veronica beccabunga* L. ⎱ Occasional by streams and
430/4 *V. scutellata* L. ⎰ in flushes.

430/5 *V. officinalis* L. Frequent in calcareous grassland.

430/7 *V. chamaedrys* L. Occasional in limestone grassland.

430/13 *V. serpyllifolia* L. Occasional in flushes and amongst limestone rocks.

430/15 *V. arvensis* L. Seen intermittently in waste places around Moor House.

432/2 *Pedicularis sylvatica* L. Frequent in wet acidic grassland at lower levels.

433/2 *Rhinanthus minor* L. Occasional in limestone grassland, common in the Moor House meadow.

434/3 *Melampyrum pratense* L. Rare on slopes of shallow heather blanket bog (Burnt Hill slope to Trout Beck).

†435/1(10) *Euphrasia curta* (Fr.) Wettst. Recorded by Wilson (1938) in limestone grassland (Knock Ore Gill).

†435/1(15) *E. confusa* Pugsl. Common in base-rich grassland.

441/3 *Pinguicula vulgaris* L. Occasional in flushed open places.

448/3 *Thymus drucei* Ronn. Common in base-rich grassland.

457/1 *Prunella vulgaris* L. Frequent in base-rich grassland.

459/7 *Stachys sylvatica* L. Single locality on a sandstone ledge (Knock Ore Gill near fell wall).

471/2 *Ajuga reptans* L. Single locality on a limestone ledge (at 1600 ft. S. of Knock Ore Gill).

472/1 *Plantago major* L. Occasional on base-rich soils in bare places (around Moor House and cattle grid on Radar Road).

472/3 *P. lanceolata* L. Frequent in limestone grassland.

475/7 *Campanula rotundifolia* L. Frequent in grassland, chiefly below 1800 ft.

479/1 *Jasione montana* L. Rare in limestone grassland (by Radar Road; Greatdale).

485/2 *Galium boreale* L. Occasional on ledges of whinsill or limestone.

485/4 *G. verum* L. Occasional in limestone grassland.

485/5 *G. saxatile* L. Common in grassland.

†485/7 *G. sterneri* Ehrend. Frequent in limestone grassland.

485/8 *G. palustre* L. Occasional in flushes.

493/1 *Adoxa moschatellina* L. Occasional amongst limestone rocks.

§*495/1 *Valeriana officinalis* L. Rare on limestone ledges (Middle Tongue Beck). Common in v.c. 69 in wet places up to 2400 ft. according to Wilson (1938).

495/3 *V. dioica* L. Occasional in flushes.

500/1 *Succisa pratensis* Moench Occasional in flushes at the lower levels.

506/1 *Senecio jacobea* L. Occasional in limestone grassland (Rough Sike enclosure; Knock Ore Gill Foot; Green Hole).

508/1 *Tussilago farfara* L. Frequent in shingle.

517/1 *Antennaria dioica* (L.) Gaertn. Occasional in calcareous grassland.

518/1 *Solidago virgaurea* L. Two localities only on acidic ledges (Force Burn Gorge whinsill; Swindale on sandstone near the waterfall).

524/1 *Bellis perennis* L.
528/1 *Achillea millefolium* L. } Common in base-rich grassland.
528/3 *A. ptarmica* L.

532/2 *Matricaria matricarioides* (Less.) Porter Single locality around fell gate on Radar Road.

540/2 *Cirsium vulgare* (Savi) Ten. Frequent in limestone grassland below 1700 ft.

540/3 *C. palustre* (L.) Scop. Common in base-rich grassland.

540/4 *C. arvense* (L.) Scop. Frequent in limestone grassland below 1600 ft.

550/1 *Leontodon autumnalis* L. Frequent in calcareous flushes.

550/2 *L. hispidus* L. Occasional on limestone ledges (Melmerby Scar Limestone in Knock Ore Gill) and occasional in the Moor House meadow and Rough Sike enclosure.

555/1 *Mycelis muralis* (L.) Dumort. Rare amongst limestone rocks (Green Burn Head).

558/1 *Hieracium*

(Cerinthoidea) *H. anglicum* Fr. Common on limestone ledges, occasional on sandstone (2100 ft. in Middle Tongue Beck).

H. ampliatum (W. R. Linton) A. Ley Frequent on limestone ledges (Great Limestone at 2400-2450 ft. in Greatdale and Green Castle; Rough Sike Gorge).

(Vulgata) *H. maculosum* (Stenstr.) Omang Locally common on limestone and whinsill (Knock Ore Gill 1500-1800 ft.)

H. vulgatum Fr. Recorded only on whinsill at 1800 ft. in Force Burn Gorge and below 1550 ft. in Knock Ore Gill.

H. silvaticoides Pugsl. Recorded only at 2000-2100 ft. on limestone in Middle Tongue Beck.

H. pseudostenstroemii Pugsl. Common on limestone ledges.

(Sagittata) *H. oistophyllum* Pugsl. Recorded only at 1550 ft. S. of Knock Ore Gill and at 2000-2100 ft. in Middle Tongue Beck on limestone.

H. crebridentiforme Pugsl. Locally common on limestone (2000 ft. in Middle Tongue Beck) and whinsill (1800 ft. in Knock Ore Gill).

H. auratiflorum Pugsl. Recorded only at 1500-1650 ft. on limestone ledges in Swindale.

H. rhomboides (Stenstr.) Johans. Recorded only from Melmerby Scar Limestone at 1500 ft in Swindale.

(Caesia) *H. cravoniense* (F. J. Hanb.) Roffey Recorded only at 1500 ft. S. of Knock Ore Gill on limestone.

558/2 *H. pilosella* L. Occasional in limestone grassland.

559/8 *Crepis paludosa* (L.) Moench Occasional in wet calcareous grassland, also some fine specimens on limestone ledges at 1500 ft. in Swindale.

†560/3 *Taraxacum spectabile* Dahlst. Frequent in disturbed ground, on limestone ledges and flushed gleys.

†560/4 *T. laevigatum* (Willd.) DC. Occasional in limestone grassland.

574/1 *Triglochin palustris* L. Occasional in flushes and on shingle.

577/2 *Potamogeton polygonifolius* Pourr. Frequent in pools of acidic water.

584/1 *Narthecium ossifragum* (L.) Huds. Frequent in wet bog (*Trichophoro-Eriophoretum*).

605/1 *Juncus squarrosus* L. Common on wet acidic soils.

605/8 *J. inflexus* L. Wet calcareous ground at the lower levels.

605/9 *J. effusus* L. Common on silty peats by streams and rivers.

605/10 *J. conglomeratus* L. Frequent up to 1800 ft., chiefly on calcareous drift.

605/18 *J. acutiflorus* Ehrh. ex Hoffm. Common in flushes at the lower levels on the western side of the Reserve.

605/19 *J. articulatus* L. Frequent in flushes.

605/22 *J. bulbosus* L. Occasional in flushes and springs.

605/26 *J. triglumis* L. Occasional in flushes (Little Dun Fell; Middle Tongue Beck; Knock Ore Gill Head).

606/3 *Luzula sylvatica* (Huds.) Gaudin One locality on a sandstone ledge (Knock Ore Gill near fell wall).

606/8 *L. campestris* (L.) DC. Common in limestone grassland and in *Pteridetum* at the foot of the western escarpment.

606/9 *L. multiflora* (Retz.) Lejeune Common in grassland.

628/1 *Listera ovata* (L.) R. Br. Single locality in a flush (Knock Ore Gill).

628/2 *L. cordata* (L.) R. Br. Occasional in blanket bog.

635/1 *Coeloglossum viride* (L.) Hartm. Rare in damp limestone grassland at low levels (Knock Ore Gill near fell wall).

643/2 *Dactylorhiza maculata* (L.) Soó subsp. *ericetorum* (E. F. Linton) P. F. Hunt & Summerhayes. Occasional in mestrophic flushes and species-rich *Nardetum*.

650/3 *Lemna minor* L. Single locality in shallow standing water in a flush (at 1400 ft. S. of Middle Tongue Beck).

654/1 *Eriophorum angustifolium* Honck. Common in blanket bog, and occasional in mestrophic flushes.

654/4 *E. vaginatum* L. Common in blanket bog.

655/2 *Scirpus cespitosus* L. Frequent in wet bog, and occasional in acidic grassland.

663/7 *Carex lepidocarpa* Tausch Occasional in calcareous flushes.

663/8 *C. demissa* Hornem Frequent in flushes and on irrigated gley soils.

663/16 *C. rostrata* Stokes Common on soligenous peat.

663/24 *C. pallescens* L. Rare on whinsill ledges (Force Burn Gorge).

663/26 *C panicea* L. Frequent in calcareous grassland.

663/28 *C. limosa* L. Single locality in eutrophic fen on organic mud (by Tees S. of Green Burn Foot).

663/29 *C. paupercula* Michx. Occasional in wet bog (Moor House pasture; Valley Bog).

663/31 *C. flacca* Schreb. Frequent in calcareous grassland.

663/34 *C. pilulifera* L. Occasional in alluvial grassland, below 2000 ft.

663/36 *C. caryophyllea* Latourr. Frequent in base-rich grassland.

663/50 *C. nigra* (L.) Reichard Common in wet acidic grassland.

663/52 *C. bigelowii* Torr. ex Schwein. Common in grassland above 2100 ft.

663/70 *C. echinata* Murr. Common on recolonisation
663/72 *C. curta* Gooden. complexes of eroding bog.

663/74 *C. ovalis* Gooden. Frequent on flushed slopes, usually on gley soils.

663/80 *C. pulicaris* L. Common in grassland.

663/81 *C. dioica* L. Occasional in calcareous flushes (Moss Burn Flush).

667/1 *Molinia caerulea* (L.) Moench Single locality on an alluvial terrace with wet Nardetum (Tees by Bog Hill).

668/1 *Sieglingia decumbens* (L.) Bernh. Frequent in acidic grassland at the lower levels.

669/1 *Glyceria fluitans* (L.) R. Br. Occasional in marshes and flushes at the lower levels.

G. × *pedicellata* Townsend Seen only in a marsh at 1750 ft. near Tees Bridge.

670/1 *Festuca pratensis* Huds. Single locality in Moor House meadow.

670/6 *F. rubra* L. Common in base-rich grassland.

670/8 *F. ovina* L. Common in grassland.

670/10 *F. vivipara* (L.) Sm. Frequent in grassland, but only detectable when ungrazed.

671/1 *Lolium perenne* L. Single locality in the Moor House meadow.

676/1 *Poa annua* L. Occasional on tracks, and at sheep camping sites in grassland; frequent in running-water flushes.

†676/12 *P. subcaerulea* Sm. Frequent in limestone grassland.

676/13 *P. trivialis* L. Occasional in calcareous flushes and on limestone ledges; common in the Moor House meadow.

678/1 *Dactylis glomerata* L. Single locality in the Moor House meadow.

679/1 *Cynosurus cristatus* L. Frequent in calcareous grassland below 2000 ft.

680/1 *Briza media* L. Occasional in limestone grassland at the lower levels.

682/1 *Sesleria albicans* Kit. ex Schult. Frequent on skeletal limestone soils.

689/1 *Koeleria cristata* (L.) Pers. Occasional in limestone grassland.

†693/1 *Helictotrichon pratense* (L.) Pilg. Rare on limestone ledges (Melmerby Scar Limestone in Knock Ore Gill; Green Castle.)

693/2 *H. pubescens* (Huds.) Pilg. Rare in limestone grassland (Moss Burn Head), also in the Moor House meadow.

695/1 *Holcus lanatus* L. Frequent at the lower levels in alluvial grassland and on irrigated slopes.

695/2 *H. mollis* L. Occasional in limestone grassland.

696/1 *Deschampsia cespitosa* (L.) Beauv. Common in calcareous grassland.

696/3 *D. flexuosa* (L.) Trin. Common in acidic grassland.

697/1 *Aira praecox* L. Occasional in alluvial grassland at the lower levels.

701/2 *Agrostis canina* L.
701/3 *A. tenuis* Sibth. } Common in grassland.

701/5 *A. stolonifera* L. Frequent in marshes and flushes.

707/5 *Phleum alpinum* L. Single locality on a limestone ledge.

708/2 *Alopecurus pratensis* L. Single locality in the Moor House meadow.

708/3 *A. geniculatus* L. Occasional in calcareous flushes.

§*708/6 *A. alpinus* Sm. Rare in calcareous flushes (Little Dun Fell), as described in Ratcliffe and Eddy (1960).

712/1 *Anthoxanthum odoratum* L. Common in calcareous grassland.

715/1 *Nardus stricta* L. Common on wet acidic soils.

Acknowledgments

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Addendum

†435/1(18) *Euphrasia brevipila* Burnat & Gremli Occasional in high-level flushes (Middle Tongue Beck).

DIANTHUS ARMERIA L. AT WOODWALTON FEN, HUNTS.

By T. C. E. Wells

(The Nature Conservancy, Monks Wood Experimental Station,
Abbots Ripton, Huntingdonshire)

Introduction

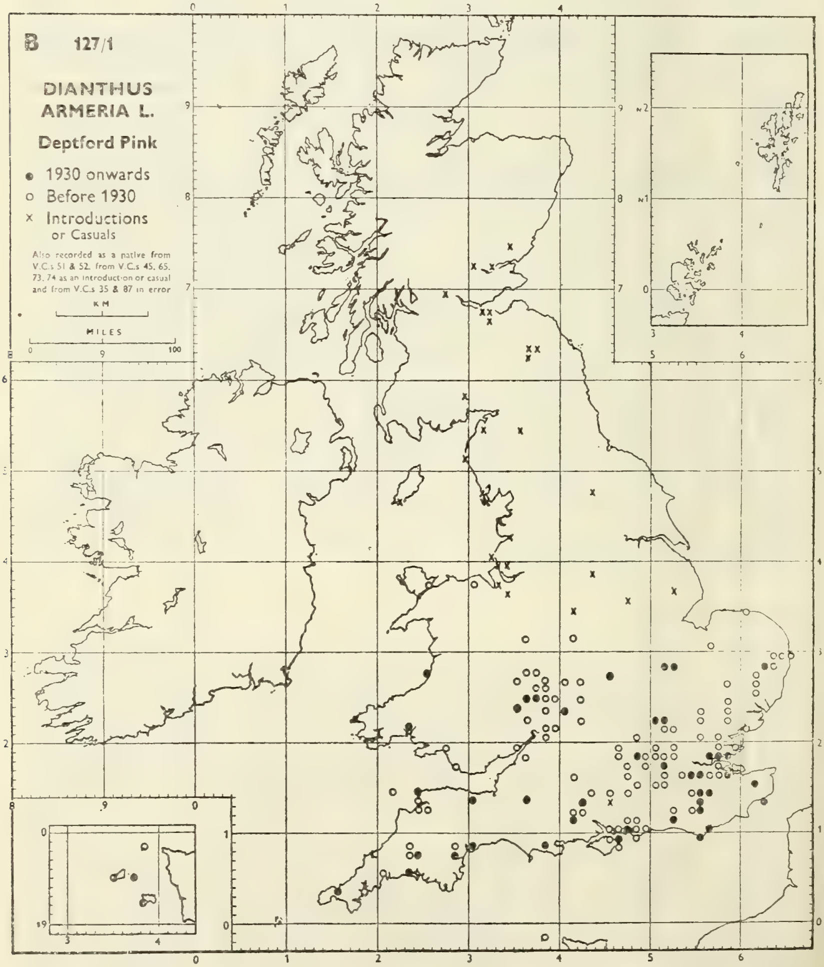
The Deptford Pink (*Dianthus armeria*) is "a rare and local lowland plant of hedgerows, waysides and dry pastures, especially on light, sandy soil" (Clapham, Tutin & Warburg, 1952, p. 290). Some idea of the rarity of this species can be gained from the *Atlas of the British Flora* (Perring & Walters, 1962) in which *Dianthus armeria* occurs in 45, 10 km. squares out of a total of 3,500. These occurrences are for 1930 onwards but apparently this species has been more widespread in the past, 93 records being shown for the period before 1930. All of the recent records are for southern England, and if introductions are ignored, the northern limit of this plant in Britain is Huntingdonshire (v.c. 31) and one station in East Suffolk (v.c. 25). One of the Huntingdonshire records is from Woodwalton Fen National Nature Reserve (G.R. 52/223834) where the plant has been known for more than 60 years. The importance of the Woodwalton site to students of plant distribution has been recognised by the Nature Conservancy and special efforts have been made to safeguard *Dianthus armeria*. In recent years, sheep and cattle have been used for managing National Nature Reserves for conservation purposes, and this paper describes the effect of grazing by cattle from 1964-66 on a small population of *Dianthus armeria* at Woodwalton Fen National Nature Reserve.

Old Records

The first record of *Dianthus armeria* at Woodwalton Fen is given by Druce in the *Victoria County History* (Druce in Page & Proby, 1926) on the authority of a local botanist, E. W. Hunnybun. The plant was first observed in 1905 and a note adds that it was still found on the Fen in 1925. Unfortunately no habitat details are given with this record. The next published record for Woodwalton Fen is by J. C. F. Fryer in the 1936 Handbook of the Society for the Promotion of Nature Reserves in which he states: "Beyond the wood is a characteristic mixture of fen and moorland plants. Clumps of heather are mixed with those of *Cladium*. Very old bushes of Bog Myrtle occur here and there with a dense growth of Reed Grass (*Calamagrostis epigejos*) on the high ground. Along the side of the path is the Deptford Pink

(*Dianthus armeria*)". This description enables the locality of *Dianthus* to be pin-pointed as the area now known as the Heath Field about 200 yards (182·0 m.) from the present location of the plant on the Fen.

In 1952, Dr. S. M. Walters recorded in a note to the Society for the Promotion of Nature Reserves: "30 to 40 plants in flower in the former cultivated field in the extreme south-east corner of the Fen". This valuable record locates the plant in 'Compartment 135', its main centre on the Fen at the present time. Since 1952, *Dianthus* has occurred annually in this area in small quantity with one or two plants appearing occasionally elsewhere on the Fen.


B 127/1
DIANTHUS ARMERIA L.
Deptford Pink
● 1930 onwards
○ Before 1930
× Introductions or Casuals
Also recorded as a native from V.C.s 51 & 52. from V.C.s 45. 65. 73. 74 as an introduction or casual and from V.C.s 35 & 87 in error
KM
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HABITAT DETAILS

The land-use history of Compartment 135 is inadequately known, although Poore (1956) states that this field, together with adjacent fields in the south-west and south-east corners of the Fen, formed part of a small farm about 50 years ago. The presence of *Arrhenatherum* as the dominant grass over much of this part of the Fen suggests that most of the fields have been cultivated in the past. However, the vegetation in Compartment 135 is quite distinct from that of the ex-arable fields and contains a polydominant community rich in species which resembles closely small areas of grassland found on the Heath Field which are known not to have been cultivated. This suggests that the *Dianthus* area has been used as rough grazings in the past and has probably never been ploughed.

Although Hawthorn (*Crataegus monogyna*), Rose (*Rosa canina*), and Birch (*Betula pendula* and *B. pubescens*) have invaded parts of Compartment 135, grazing by rabbits and hares has maintained fairly large enclaves of grassland in which ant-hills are frequent and conspicuous.

The soil, which is about 3 feet (0·9 m.) deep, is almost pure peat with an open structure in which the dead remains of plants are clearly visible. The pH of the top 12 inches (30·5 cm.) of soil ranges from 4·6 to 5·3 with a mean value from 6 samples of 4·8. The acid reaction of the soil is reflected in the vegetation by the presence of acidiphilous species such as *Calluna vulgaris, Molinia caerulea* and *Agrostis tenuis*. The following species were recorded from an area 50 m.^{2} taken in the main *Dianthus* area:—

Agropyron repens	o
Agrostis tenuis	f
Anthoxanthum odoratum	a
Arrhenatherum elatius	o
Calamagrostis epigejos	loc. a.
Festuca rubra	f
Holcus lanatus	o
Helictotrichon pubescens	o
Molinia caerulea	r
Poa pratensis	o
Luzula campestris	f
Achillea millefolium	o
Achillea ptarmica	loc.
Agrimonia eupatoria	o
Angelica sylvestris	r
Arabis hirsuta	loc. f.
Calluna vulgaris	r
Centaurea nigra	o
Cirsium palustre	o
Convolvulus arvensis	r
Chrysanthemum leucanthemum	o
Crataegus monogyna	r
Epilobium angustifolium	loc.
Dianthus armeria	loc.
Filipendula ulmaria	r
Galeopsis tetrahit	o
Galium verum	o
Hieracium pilosella	loc. abund.
Hieracium umbellatum	o
Heracleum sphondylium	r
Hypericum perforatum	o
Lathyrus pratensis	r
Linaria vulgaris	o
Lotus corniculatus	o
Lythrum salicaria	r
Pastinaca sativa	r
Potentilla erecta	f
Potentilla anserina	o
Plantago lanceolata	f
Prunella vulgaris	r
Rosa canina	r
Rumex acetosa	o

Senecio viscosus	f	*Urtica dioica*	o
Stellaria graminea	f	*Veronica chamaedrys*	o
Succisa pratensis	o	*Veronica officinalis*	loc. f.
Tragopogon pratensis	r	*Vicia cracca*	f
Trifolium repens	r	*Viola canina* subsp. *montana*	o

MANAGEMENT 1964-66

Before 1964, the *Dianthus* area was not managed in any way except for the occasional clearance of small scrub by hand, which entered into the open grassland when rabbit populations were low. In the summer of 1964, 5 plants of *Dianthus armeria* in flower were counted on or near ant-hills which had been used by rabbits as latrines. A careful search of other areas in Compartment 135 revealed no further plants, and although it is realised that a few vegetative plants may have been overlooked, the 1964 population is taken as 5.

From November 1964 until April 1965, 33 Friesian heifers grazed on the vegetation at the southern end of the Fen. The effect on the vegetation was dramatic. Tall herbage 1½ to 2 feet (45·7-61·0 cm.) high was eaten and trampled, and at the end of April the turf was a uniform ½ inch (1·3 cm.) high over most of the *Dianthus* area with considerable areas of bare soil exposed by the trampling of the cattle. After the cattle were removed at the end of April the vegetation changed rapidly with a flush of growth in the grasses and associated herbs. A careful search of the compartment revealed 50 plants of *Dianthus*, mostly in flower, and centred on the area where the 5 plants recorded in 1964 grew. However, a second group was discovered some hundred yards to the northeast of the original group growing in the open grassland away from any ant-hills. These plants had arisen presumably from seed shed in 1964 or at some time earlier. The plants recorded in 1965 ripened their seed and by the end of October, most of this had been shed. The old inflorescence stalks persisted throughout the winter and new rosettes of leaves were produced at the base of the old plants from buds on the underground rootstock, thus proving the truly perennial nature of *Dianthus armeria*.

In January 1966, 10 Galloway bullocks were purchased and used to graze the southern end of the Fen. For the first two months, the bullocks grazed heavily in the *Dianthus* area, being attracted by the more palatable species which grew there, especially *Anthoxanthum, Poa pratensis* and *Luzula campestris*. This resulted in the area around the old *Dianthus* plants receiving a considerable amount of trampling and disturbance and although the tips of the leaves of *Dianthus* were grazed by the cattle, the appressed habit of the rosette prevented greater defoliation.

Cattle were excluded from the *Dianthus* area from 20th March until 24th June and following this, there was a flush of growth, especially in the grasses and a considerable flowering of many herbs, particularly *Arabis hirsuta* and *Stellaria graminea*. The rosettes of *Dianthus* increased in area only slightly during this period.

In early June, flowering stems developed from the centre of the rosettes and the inflorescences elongated rapidly, reaching 12 to 15 inches (30·5-38·1 cm.) in height by the end of June. Flower buds were visible by early June and the first open flowers were seen on 7th July.

Cattle were allowed to graze in half of 'Compartment 135' from 25th June onwards, and observations were made on the effect of this treatment on the *Dianthus* plants in the grazed areas.

1966 Survey

A systematic search was made in Compartment 135 on 20th July for flowering and vegetative plants of *Dianthus*. Plants were divided into two classes: (i) those with undamaged inflorescences and (ii) plants with inflorescences damaged by cattle, rabbits or hares.

336 plants were recorded, 176 in the area protected from grazing and 160 in the area grazed by bullocks during the flowering period. 16 plants (9%) of the plants in the area not grazed by cattle had the inflorescence bitten off at about 3 inches (7·6 cm.) above ground level. Hares and rabbits are thought to have been responsible for this damage. In the grazed areas, 29 plants (13%) of the inflorescences were damaged, partly by the cattle but some by rabbits and hares.

Discussion

Dianthus armeria has been known at Woodwalton Fen for more than 60 years and in the absence of evidence to the contrary, it may be assumed that the plant is native there. Before 1965, no more than 40 plants had been recorded there, and it is reasonable to suggest that grazing by cattle during 1964-66 has been responsible for the increase from 5 plants in 1964 to 336 plants in 1966. The precise environmental conditions which seeds of *Dianthus* require for successful germination and establishment are not known but indirect evidence, mainly from local Floras suggest that *Dianthus* requires open conditions for success. In 21 local Floras which were consulted, about 90% of records were for disturbed habitats such as railway embankments, gravel pits and at the edges of sandy fields. The other habitats described were hedgebanks, gravelly banks and occasionally pastures. These records suggest that *Dianthus* is unable to compete with taller growing vegetation and requires bare soil or ground not completely covered with vegetation for establishment from seed. These conditions were provided at Woodwalton Fen by the trampling of cattle which, in addition to creating areas of bare ground, were also responsible for greatly reducing the height of the surrounding vegetation. Moreover, it is significant that before cattle grazed on the Fen, the commonest habitat of *Dianthus* was the flat tops of old ant-hills which were used as latrines by rabbits and which were disturbed by rabbits scratching.

Seed production by *Dianthus* is considerable, a normal-sized plant producing about 400 seeds. Preliminary germination tests indicate that after storage at room temperature for six months germination is about 70%. However, there is some evidence to suggest that an inhibiting factor in the seed may prevent it from germinating for 4 to 5 months after being shed, which may be an important factor in determining the success of the seed under field conditions. Ideally, the conservation of rare and local plants should be based on scientific knowledge gained from autecological studies. Unfortunately, studies of that type are time-consuming and require many years of patient observation and experimentation. It is worthwhile reporting then that an empirical approach used at Woodwalton Fen for managing part of a Nature Reserve has not only been successful in producing an increase in the numbers of a rare plant, but has also enabled many species which were uncommon on the Fen such as *Arabis hirsuta* to increase considerably.

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CHANGES IN THE FLORA OF PART OF LEICESTERSHIRE SINCE 1884

By A. L. Primavesi

When the plants in the neighbourhood of Ratcliffe College, near Leicester, were recorded by the author for the B.S.B.I. Distribution Maps Scheme, it was found useful to consult the manuscript notes and the herbarium of a former science master at this school, the Reverend J. A. Cappella, whose records extended back to 1884. If it was found that he mentioned a species that had not been recorded, a visit was made to his localities to fill in the gaps. In the course of this investigation, three interesting facts came to light. In the first place, many species, some of which Cappella recorded as common or frequent, had disappeared. On the other hand, some species which he described as rare or occasional were now quite common. Most curious of all was the case of a few species which he described as being confined to very restricted localities. These sites were visited; the plants were still found there, and they were still restricted to a very small area.

The Reverend J. A. Cappella, who died in 1943 at the age of 86, was a botanist of considerable local repute. He began his career as a science master at Ratcliffe College in 1879, and taught for 50 years until his retirement in 1929, after which he remained in residence at the school until his death. During this long period he made a thorough study of the flora of the neighbourhood and built up his herbarium. He also left the manuscript notes of local plant records, to which reference has been made above, and a survey of the plants in the immediate neighbourhood of Ratcliffe College.

Ratcliffe College is situated in the 10 kilometre square 43/61; the full grid reference is 43/624150. Hence most of the records, both of Cappella and of the more recent investigations, are from this square and the adjacent square 43/51 to the westward. The geological formations in these two squares include Keuper Marl, Lower Lias Limestone, the Mountsorrel Granite, and the Precambrian rocks of Charnwood. In the immediate neighbourhood of the College the Lower Lias is overlaid by about 6 metres of glacial drift in the form of chalky boulder clay.

On this chalky boulder clay overlying the Lias Limestone one might expect to find a number of calcicole species. Cappella recorded *Linum catharticum, Plantago media,* and *Cruciata laevipes* as common or frequent in the immediate neighbourhood of the school, and *Anthyllis vulneraria, Filipendula vulgaris,* and *Centaurea scabiosa* in isolated but well described localities. Of these, only *Plantago media* remains to-day, in a few permanent pastures near the school. *Cruciata* can still be found occasionally at a distance of a few miles from the school, but no trace has been found of *Linum catharticum.* Of the habitats in which Cappella found the other three calcicole species mentioned, more will be said later, but none of the plants is still to be found there now. He has left a herbarium specimen of *Cirsium acaulon* found in 1888 on the roadside near the village of Ratcliffe on the Wreake. The description of the locality is rather vague, and the plant has not been found recently anywhere in the neighbourhood. He also recorded *Thymus serpyllum* (?) in a field near the Ratcliffe crossroads, but a later note added to his records showed that the site where this plant had grown was destroyed by the building of a petrol station about 1930.

It seems surprising that the very chalky boulder clay in the vicinity of the school does not carry more calcicole species, especially as Cappella's records showed that such plants did occur in these localities, at least until about 1920. It is possible that different agricultural methods may have had some influence, and especially the fact that there is very little permanent grassland to-day, whereas at one time this part of the county was almost entirely devoted to sheep and dairy farming.

Another notable change in the records since the 1880s is the decline of certain woodland species. Charnwood still retains its woodland flora almost unchanged, but there is a noticeable change in the immediate vicinity of the school, which perhaps is best illustrated with reference to the Orchidaceae. Cappella recorded as frequent *Epipactis helleborine, Listera ovata, Orchis mascula,* and what he called *'Orchis maculata'.* The first three he recorded as being common in the College Wood, but a note added later stated that all three had disappeared from there by 1929. Since then much of this wood has been felled to make room for buildings, and it is now used as an activity area by the school scout troop, who leave very little ground flora. Until 1966 *Orchis mascula* occurred in abundance in Cossington Gorse, just north of the school, but this area has now been completely felled, cleared, and ploughed. *Listera ovata* was found recently in one wood near the school, but *Epipactis helleborine* has not been recorded in this neighbourhood since Cappella's record of a single specimen found in 1930. *Dactylorhiza fuchsii* and *D. maculata* subsp. *ericetorum* are, however, still to be found in various scattered localities, but it is not known which of them is represented by the *'Orchis maculata'* of Cappella's records.

The disappearance of the remaining few plants which Cappella recorded and which were not found recently is obviously due to a radical change in the nature of the habitat. This is particularly so in the case of the plants he recorded along the sides of the Fosse Way, which passes the College gates. Before the First World War this Roman road was usable only as far as the crossroads about a mile north of the school, beyond which it became a little-used cart track. It is now the A46, carrying very heavy traffic, and work is at present in progress which will make it a dual carriageway from Leicester to Lincoln. It is therefore not surprising that *Genista tinctoria, Anthyllis vulneraria,* and *Filipendula vulgaris* should no longer be found there.

Cappella recorded *Centaurea scabiosa* and *Succisa pratensis* on Shipley Hill, a wooded tumulus near the River Wreake. He attributed their presence to the isolated and undisturbed nature of the hill. However, when a search was made of this place recently, neither of these plants could be found, and the tumulus showed signs of having been frequented by children and other visitors.

Orchis morio appeared in Cappella's records as common in the fields immediately surrounding the school. It is certainly not there now. His records did, however, lead to the rediscovery of this plant near the village of Seagrave, in what he described as 'hilly pastures', and where he also recorded *Anthyllis vulneraria.* This is a likely place for calcicole species, because the boulder clay is very thin near Seagrave, and the Lias outcrops in many places. *Anthyllis* was not found, but *Orchis morio* was discovered in abundance, and also large quantities of *Ophioglossum vulgatum* which Cappella had not recorded. These particular fields, on a steep slope and divided by hedges into tiny awkward shapes, looked as if they had never been ploughed. However, since they were visited in 1960, the hedges have been removed and the land has been put under cultivation. The present rarity of *Orchis morio* in this neighbourhood seems to be due to the lack of permanent grassland. It is quite likely that there are still suitable habitats in the hilly region near Seagrave, but it is unfortunate that one of these last outposts has been destroyed.

To offset these records of disappearances and decreases, there are a few species which seem to have increased in recent years. One of these is *Epilobium angustifolium,* which is known to have increased over most of the country since the clearance of woodland during the First World War. Cappella first recorded a few plants in 1916 in a locality where it now abounds, and it is common to-day in all suitable habitats in the neighbourhood.

Chrysanthemum parthenium is now such a common weed of suitable places in this neighbourhood that one would never suspect it of having been a relict of cultivation. It used to be employed as a medicinal herb in cases of fever. Cappella recorded it first in 1884, on an island in the River Wreake. He said: "It may have been a garden escape, washed on the island by the Queniborough Brook, in flood time".

The status of the two Fluellens in this part of Leicestershire is rather puzzling. Cappella recorded both *Kickxia spuria* and *K. elatine* in a field near the school. He said: "This field is of interest, owing to the presence of the Linarias (*sic*). *L. spuria* is regarded as rare in Leicestershire. In 1886 there was a ploughed field to the west of the Fox Covert, which had been left in fallow. It was literally covered all over with *L. spuria* in full bloom". The field in question became part of a private aerodrome in 1930, and most of it is now used as an extension of the school playing fields. In the small part which has reverted to arable land several plants of *Kickxia spuria* were found in 1964, and a single plant in 1965, but in 1966 it was not found in spite of careful search. In 1959 *Kickxia elatine* was present in abundance in waste places in the school grounds, but there was no trace of it in the following year, and this was the only time that *K. elatine* has been found by the author in the neighbourhood. In the same year, 1959, there was a wheat field to the west of the school which, as far as could be seen without trampling the crop, was 'literally covered all over' with *K. spuria* under the wheat.

The last note in Cappella's records was added in a very shaky hand a year before his death, when he was 85 years old. "To-day, Aug. 17th, 1942, I found a single plant of *Solanum nigrum* in gravelly path way at College. The only time I have found it at Ratcliffe". Recently, at least since about 1960, one can expect to find this plant quite frequently, especially as a garden weed. It would be interesting to know whether it has been establishing itself since 1942, or whether it is being regularly introduced with garden plants obtained from nurseries. It seems that the former is likely, because it appears in borders which have not had new plants added to them.

The feature which was of greatest interest in the study of Cappella's records was the case of the few species, confined to very restricted localities, which were refound by following his directions. No doubt the existence and locations of some of these plants are well known throughout the county, but a great thrill was obtained when they were still found there after 80 years, and still restricted to a small area.

The presence of *Teesdalia nudicaulis* and *Umbilicus rupestris* in the old disused slate quarries at Swithland is generally well known. *Teesdalia* grows in abundance on the waste heaps surrounding the quarries in the middle of Swithland Wood. *Umbilicus* occurs on the steep rocky sides of the old quarries, and also in comparative abundance in the private grounds of the Brand. This latter site was preserved by its late owner, Sir Robert Martin, as a portion of Charnwood Forest in its original state before enclosure, and thus locally rare plants such as *Umbilicus* have been protected. Its presence in such of the old quarries as are open to the public is no doubt due to its virtual inaccessibility, because the vertical sides of these sinister water-filled pits are practically unclimbable.

At the base of several of the trees lining the front drive of Ratcliffe College there are clumps of *Deschampsia flexuosa*. This grass was included in records for the Distribution Maps Scheme, but at first the record was queried as an unlikely part of the permanent flora of this neighbourhood. Nevertheless, reference to Cappella's records showed that it had been there at least since 1916.

Cappella recorded *Medicago arabica* as growing on the bank of the River Wreake at Syston Mill in 1885. It is still there to-day, in a small patch of a few square yards. Syston Mill is a fibreboard factory, and as far as can be ascertained by enquiry it has been so for over a hundred years. It is therefore possible that *Medicago arabica* was originally introduced as a casual with raw materials for the factory, but it is curious that it has persisted for so long without either decreasing or spreading.

One of the most fascinating places which Cappella mentioned in his records was the common land to the west of the hotel at Six Hills which he called Mandy's Gorse. This is just in square 43/62, and is on the county boundary, so that part of it may be in Nottinghamshire. It is very run-down common land, with ill-drained peaty and highly acid soil. Most of Cappella's records for this place were dated 1916, when he visited it in company with A. R. Horwood. It then contained many plants which are not found elsewhere in the immediate neighbourhood, and most of them are still present. The most interesting of these are *Genista anglica, Cirsium dissectum,* and *Serratula tinctoria,* besides other plants such as *Molinia caerulea* and *Nardus stricta* which are characteristic of such peaty soil, but for which there are few suitable habitats in this neighbourhood.

Cappella wrote his notes in school exercise books, a number of which have passed into the author's possession. Each has a label pasted on it which states: "Important. Do not destroy this manuscript". They are extremely interesting, and, in the collection of records for the Distribution Maps Scheme, they were very useful. At least they are an encouragement to the author for him to leave some records behind him in his turn, which, though perhaps they may not reveal anything of great scientific value, might nevertheless be of interest to someone else in years to come.

THE SCIENTIFIC IMPORTANCE OF UPPER TEESDALE

By H. Godwin and S. M. Walters

In the development of scientific botany, the 18th Century and the first half of the 19th Century were concerned largely with descriptive studies in which the identity of the individual species (as opposed to the communities or groups of species growing together) was stressed. Thus there was early recognised a small number of remarkable localities in the British Isles, each distinguished by a collection of rare or local species of plants growing there. Upper Teesdale was in this category. We find that the outstanding rarities of the valley had been described before the end of the 18th Century, and detailed exploration by botanists in the first half of the 19th Century added most of the less conspicuous of the vascular plant species to the list.

This early "floristic" recognition of the Upper Teesdale peculiarities excited an interest which resulted in a more intensive study mainly in the present century. Comparative plant geographical studies, comparing the British flora with that of Continental Europe, showed that the Teesdale assemblage of rare plants was made up of a remarkable mixture of diverse elements viewed from the point of view of their total world distribution. Some of the species such as the famous Spring Gentian (*Gentiana verna*) were recognised to be in their main distribution "alpine" (i.e. plants of the principal Central European mountain ranges), others such as the "Teesdale Violet" (*Viola rupestris*) were found to be widespread in North and Central Europe. Yet others were discovered to be arctic, arctic-alpine, or even somewhat southern in distribution type. (A list of some of these "Teesdale Assemblage" species with their distribution types is given in the appendix.)

With the development of the science of ecology in the present century came the recognition and, gradually, the detailed investigation of the connection between the occurrence of the peculiar flora of Teesdale and the presence of unusual geological and climatic features. The descriptive geology of the 19th Century had determined the main areas of the highly peculiar metamorphosed "sugar limestone" (the main outcrops in Britain being almost wholly confined to Upper Teesdale) and the significant correlation of some at least of the assemblages of rare Teesdale species with this peculiar soil type had been noted. This type of study led to much speculation on the causes of the assemblages of rare species, culminating in a famous discussion at the Royal Society in 1935 (Royal Society, 1935).

At about this time the growth of quaternary studies involving the identification of "sub-fossil" remains of plants (and animals) in deposits of peat, lake-beds, etc., was beginning to supply the key to the mystery of the collection of small populations of rare plants in Teesdale. It is important to emphasise how relatively recent is this enormous growth in scientific knowledge of the history of our present vegetation and flora, so that what was in 1935 largely a matter of conjecture is now established beyond reasonable doubt. The Teesdale assemblage of species is to be interpreted as a relict flora—fragments of vegetation types, similar to those in the Arctic tundra to-day, which were widespread in the British and N.W. European countryside some 10,000 to 12,000 years ago. The direct evidence for this is now available in the form of sub-fossil records of nearly all the rare Teesdale plants in so-called Late-Glacial deposits elsewhere in Britain and in lowland Continental Europe, well outside the areas where the species are growing to-day. It is this proof that the unique Teesdale plant communities are surviving relics of an ancient vegetation type, now very largely obliterated from temperate Europe, which makes these communities so specially valuable and precious to scientists. They are precarious survivors, easily destroyed and quite irreplaceable.

During the past thirty years quaternary studies have provided us with a fairly clear outline of the post-glacial changes, over roughly the last 10,000 years, in our vegetation, climate and soils. From an arctic tundra landscape, in which many low-growing plants of the Teesdale relict type must have been widespread, two main changes have taken place, namely, the spread of forest over most of the land and the spread of acid bog over most of the rest of the land surface unsuitable for forest. Both forest and bog were inimical to the Late-Glacial flora, which was made up of light-demanding species mainly adapted to growing on alkaline or neutral soils of relatively high base status. Thus, over the period of climatic improvement, the Late-Glacial flora retreated on all sides and many species became totally extinct over very large areas of N.W. Europe, including Britain. At the present-day then, fragments of relict floras survive precariously in Britain, but only where a peculiar composition of unstable base-rich soils and special climate have prevented the forest or the bog ever effectively closing over the area, and where, more recently, man's actions have spared them.

The gradual and ultimately complete *isolation* of these relict communities over the millenia imparts a very special scientific value and interest to their detailed composition, for from them we can learn something of the problems of micro-evolution in terms of genetics and the variability of small populations. Detailed experimental studies of this kind have been undertaken and are being actively pursued at present on Teesdale species, particularly from the Universities of Durham and Newcastle-upon-Tyne. The work of Professor D. H. Valentine and his student M. J. Harvey on *Viola rupestris* (Valentine and Harvey, 1961) is typical of these studies, which are proving to be of great general interest. Other similar studies on Teesdale plants are those of T. T. Elkington (now Lecturer in the Department of Botany, University of Sheffield and formerly a research student of Durham) on *Potentilla fruticosa* and *Gentiana verna,* both published in the British Ecological Society's "Biological Flora of the British Isles" (Elkington and Woodell, 1963, and Elkington, 1963).

Three other areas in the British Isles share with Upper Teesdale some of these features of relict flora and vegetation. These are the Lizard Peninsula in Cornwall, the Burren region of Co. Clare, W. Ireland, and the Ben Lawers range of mountains in the Central Highlands of Scotland. In all these cases a remarkable assemblage of rare and local species is associated with peculiarities of geology and soil. All three are, however, different from each other and from the Upper Teesdale area in highly significant respects. Thus the Lizard flora is developed mainly on serpentine rock, contains no arctic or arctic-alpine species, and has only one rare species of vascular plant in common with Upper Teesdale; the Burren flora shares several rare species with Upper Teesdale (notably the Gentian) but is developed at or near sea-level and shows the association of arctic-alpine species with others of Mediterranean and Iberian range; and the Ben Lawers flora is predominantly a high-level, arctic-alpine flora associated with mica-schist. Each of these famous sites is complementary to the others; the same general explanation of relict populations applies to them all; but the special features of Upper Teesdale are unique. These areas are therefore comparable, but the significance of the Upper Teesdale site for scientific research is enhanced by the comparison and contrast with these other few and scattered relict habitats.

If a wider view is taken, and the question is asked "Are there no sites similar to Upper Teesdale elsewhere in Europe or the N. Hemisphere', one can only reply that to the best of our present scientific knowledge the Teesdale relict flora and vegetation is unique. The highly peculiar metamorphosed 'sugar limestone' is a rare geological feature, and its combination in Upper Teesdale with a relatively oceanic upland climate is presumably responsible for the extraordinarily diverse phytogeographical elements associated together.

Famous sites with relict floras described elsewhere in the N. Hemisphere include the Baltic islands of Öland and Gotland (which resemble the Burren far more closely than Teesdale) and the Gaspé Peninsula in N.E. Canada, whose flora is in terms of species very different from the European ones.

In conclusion, it can therefore be stated that the Teesdale relict communities are unique; that they represent a surviving fragment of a formerly widespread vegetation type; that other fragments differ both in floristic composition and in environmental factors; and that research on the Teesdale communities is an increasingly important part of a combined long-term research field involving the co-ordination of evidence from many different places. Finally, these fragmentary communities, intolerant of environmental change, represent a precious international heritage which we must preserve.

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APPENDIX

SOME OF THE RARE OR LOCAL SPECIES WITHIN THE TEESDALE ASSEMBLAGE.

VASCULAR PLANTS

A-A/M	*Armeria maritima* (Mill.) Willd.
A-A	*Carex capillaris* L.
C	*Carex ericetorum* Poll.
A-A	*Draba incana* L.
A-A	*Equisetum variegatum* Web. & Mohr
Al (+ N. Russia)	**Gentiana verna* L.
A-A	*Juncus triglumis* L.
A-A	†*Kobresia simpliciuscula* (Wahlenb.) Mackenzie
A (+ 'pre-alpine')	**Minuartia stricta* (Sw.) Hiern
Al (+ N. Russia)	*Minuartia verna* (L.) Hiern
M	*Plantago maritima* L.
?C	*Polygala amara* L.
A-A	*Polygonum viviparum* L.
Al	*Primula farinosa* L.
A-A	*Thalictrum alpinum* L.
A-A	†*Tofieldia pusilla* (Michx.) Pers.
C	*Viola rupestris* Schmidt

BRYOPHYTES

A-A	*Amblyodon dealbatus* (Hedw.) B. & S.
A-A	*Catoscopium nigritum* (Hedw.) Brid.
A-A	*Cinclidium stygium* Sw.
A	*Haplodon wormskjoldii* (Hornem.) R. Br.
A-A	*Meesia uliginosa* Hedw.
C	*Rhytidium rugosum* (Hedw.) Kindb.
Al	*Scapania aspera* Bernet.
?	*Sphagnum imbricatum* Hornsch. ex Russ.
A	*Splachnum vasculosum* Hedw.
?C	*Tortella densa* (Lor. & Moll.) Crundw. & Nyh.

*Confined in Britain to the Upper Teesdale area.
†Confined in England to the Upper Teesdale area.

Type of General Distribution outside Britain

A of *arctic* distribution.
A-A of *arctic-alpine* distribution.
A-A/M of *arctic-alpine* and *coastal* distribution.
Al of *alpine* distribution.
C of *northern continental* distribution.
M of *mainly maritime* distribution.

A NEW LOCALITY FOR LIPARIS LOESELII

By A. J. Willis
(Department of Botany, University of Bristol)

The sand-dune variety of the Fen Orchid, *Liparis loeselii* (L.) Rich. var. *ovata* Riddelsd., has hitherto been known in Britain only from Glamorgan and Carmarthen. The discovery of its occurrence in the sand-dune system of Baunton Burrows, N. Devon, provides a substantial extension in its range. A single clump of the plant was found (A.J.W.) during the course of ecological studies on the Burrows on 23rd June 1966. No other specimens of the plant were seen in the dune slack concerned, which was also examined by Dr. J. F. Hope-Simpson and members of the student party.

The plant was clearly vigorous, bearing, in addition to a small lateral shoot with two foliage leaves, two adjacent flowering spikes: one of these was 12 cm. tall, with nine flowers; the second inflorescence was smaller (7·5 cm. tall) with three flowers. Pairs of healthy subopposite keeled leaves sheathed the bases of the inflorescences; the dimensions of the leaves associated with the larger flowering spike were as follows:

	Length	Breadth
Lower leaf	5·5 cm.	3·6 cm.
Upper leaf	4·8	3·3

These broad, ovate-elliptical leaves with blunt tips are typical of the dune variety of the plant, var. *ovata*.

The interdunal slack where the plant was found is one of the most seaward in the system and, although there is much bare sand in the site, supports a good growth of Creeping Willow, *Salix repens* subsp. *argentea,* an important component of the vegetation of the low-lying areas of the Burrows (Willis, Folkes, Hope-Simpson & Yemm, 1959). *Liparis loeselii* was growing in a clump of the willow, which here reached a height of about 20 cm.; some protection from exposure to wind was consequently given. Other plants in the immediate vicinity of the orchid were:

Agrostis stolonifera
Blackstonia perfoliata
Juncus articulatus
Leontodon taraxacoides
Sagina nodosa
Salix cinerea subsp. *atrocinerea*
Barbula tophacea
Riccardia pinguis

Elsewhere in the slack were *Juncus gerardii, Glaux maritima, Epipactis palustris* and relict *Ammophila arenaria,* but in some places the vegetation was sparse.

The site, initially stabilized by water, is not subject to extensive flooding because of its position near to the shore, but the plants would normally lie well within the range of the capillary rise of the water table.

The environmental conditions and the composition of the community in which *Liparis* occurs at Braunton Burrows are fairly similar to those of the Welsh sites for the plant, although there the vegetation may be much more closed. Also at Braunton the sand is much too calcareous to support the growth of *Sphagnum,* with which *Liparis* may be associated (Summerhayes, 1951). It seems possible that the origin of the N. Devon plant may be from seed from one of its sand-dune localities in S. Wales (some five stations are known); the large population at Kenfig Burrows, Glamorgan, could be a possible source of seed, or plants at Towyn or Laugharne Burrows in Carmarthen. Mr. P. F. Hunt, who kindly confirmed the determination of the plant from Braunton Burrows, expressed the view that, like other orchids, *L. loeselii* may achieve wide distribution with its minute seeds and could have originated from wind-borne seed carried across the Bristol Channel.

Although the single plant at Braunton Burrows must have been developing there for several years to reach its present size—pseudobulbs are first produced in the second year after germination, and the first leaf two years later (Summerhayes, 1951)—it cannot have been in the site for very many years because of the changes known to have taken place there. Records by Dr. J. F. Hope-Simpson and others show that the particular slack was almost completely bare of vegetation in 1953 and has become progressively colonized during the last decade; the increase of *Salix repens* in the last five years has been considerable, and many species are now present.

It seems possible that the orchid may be successful in its new habitat, and the spread to this site help to offset its reduction elsewhere. The population of the fen form in E. Anglia has been substantially diminished as a result of drainage in recent years and a decrease of the plant in Belgium reported (Robyns, 1958).

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MAPPING FLORAS:
PAPERS READ AT THE ANNUAL GENERAL MEETING, APRIL 1966

The following two papers on mapping the flora of Europe and France were read on 23rd April 1966 at the Annual General Meeting held at the Royal Botanic Gardens, Kew.

MAPPING THE FLORA OF EUROPE

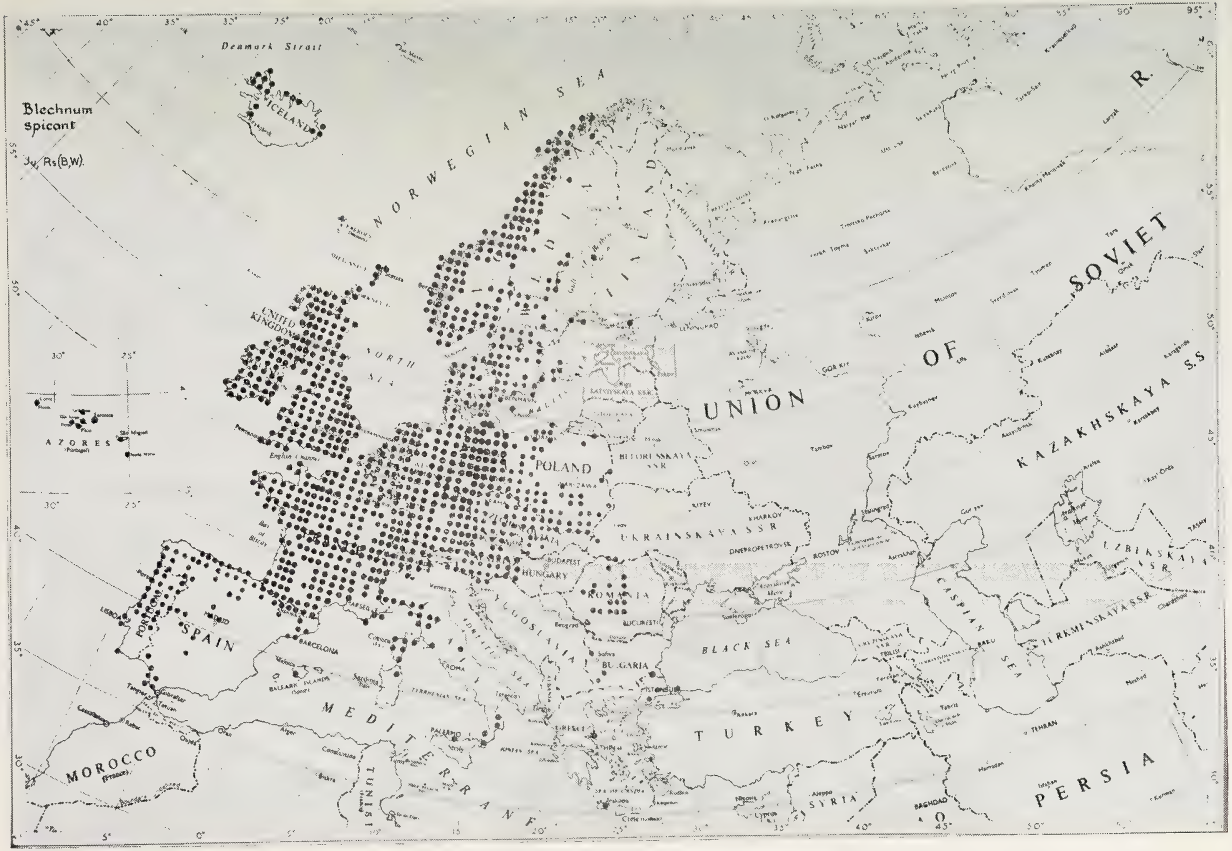
By F. H. Perring

It is certain that the publication of Hulten's *'Atlas över Kärlväxterna i Norden'* inspired British botanists to begin work on the *'Atlas of the British Flora'*: it now seems likely that the publication of our *'Atlas'* has had some effect in encouraging botanists in a number of European countries to begin work on producing Atlas's of their own. Prof. Dupont's paper (see p. 357) outlines the scheme which he is organising in France, but this is only one of several schemes. Prof. Galiano of Seville is beginning work in Spain, Prof. Ehrendorfer of Graz is co-ordinating the activities of several Central European countries to map the Flora of the Alps, and there has long been a similar organisation for mapping the Flora of the Carpathians.

Early in 1964 Dr. Walters and I became aware of this increasing interest. Bearing in mind the number of countries which had already completed, or almost completed, the collection of distribution data, e.g., Belgium, Holland, Denmark, Norway, Sweden and Finland as well as ourselves, we decided that the International Botanical Congress in Edinburgh in August of that year would provide a splendid opportunity to see whether the new schemes and the existing data could be welded together to develop a plan for mapping the Flora of Europe as a whole. Co-ordination of the new schemes at an early stage might be important for the final success of a European scheme.

Two recent developments have made a European scheme more feasible. First the publication of *Flora Europaea,* which would provide a common basis for nomenclature and taxonomy (the presence of Vol. I at the Congress was eloquent proof of the reality of this development); secondly, the appearance of a complete set of maps for Europe on a 1 : 1,000,000 scale bearing the Universal Transverse Mercator Grid, which could provide a common mapping unit, especially as the same grid was also appearing on large scale maps within individual countries.

At a demonstration during the Congress we exhibited maps of *Silene acaulis* showing its presence and absence in 100 km. and 50 km. squares of the grid. It was generally agreed that maps



Distribution of *Blechnum spicant* in Europe

on the former basis were too inprecise to be valuable, but that the latter were acceptable.

An open meeting took place in Edinburgh on 5th August 1964. As a result of this a working party was set up which met before the Congress ended at which it was agreed that during the next twelve months an experiment should be carried out by producing maps on the 50 km. U.T.M. grid squares of ten species which were taxonomically straightforward, but exhibited a wide range of phytogeographical types. The ten species were:—

Blechnum spicant
Bunias orientalis
Calamagrostis arundinacea
Ceterach officinarum
Echium rubrum
Eryngium maritimum
Myosurus minimus
Schoenus nigricans
Silene acaulis
Sorbus torminalis

I agreed to act as Secretary for the experimental period. The Flora Europaea Secretariat kindly agreed to finance the purchase of the necessary maps for Europe, and recording sheets were prepared at Monks Wood Experimental Station of the Nature Conservancy. Following advice from the Flora Europaea Secretariat, and through their good offices, an attempt was made to find a collaborator in each country of Europe who would be prepared to fill in a record sheet for each of the ten species which occurred in his country. No other information was asked for than an indication by circling a square that a species occurred within it, though different symbols were requested for extinction or introduction. In May 1965 I was able to visit France, Czechoslovakia, Hungary and Austria to discuss the practical problems in countries where the state of knowledge was not always so far advanced as our own, or where co-ordination with other international schemes, e.g., Alps and Carparthians, was desirable. The willingness to collaborate was widespread and by mid-July records had been received from all the countries of Europe, though in a few cases (Italy, Bulgaria and the U.S.S.R.) data were not available for all species.

Willingness however is not enough: my experience suggested that it might be necessary to think of Europe in three major areas: the countries of north-west Europe with relatively small floras and a very thorough knowledge of the distribution of that flora; the countries of Central Europe with a medium sized flora and good knowledge of rarer species but, at the moment, inadequate information about common species; and southern European countries with large floras and great gaps in knowledge of species distribution in general. If a successful scheme were to be operated in Europe botanists from north-west Europe would have to consider ways of helping the countries of southern Europe, perhaps by sending expeditions to collect data from little worked areas, and by abstracting information from their own national herbaria. The central-European countries would be ready to provide adequate information within about ten years, by which time information for the common species on a 50 km. square basis would have become available.

There are about six thousand 50 km. squares covering Europe and the Flora has about fifteen thousand species. That is nearly twice as many squares and nine times as many species as were dealt with by the *Atlas of the British Flora*. The total number of records may well exceed ten million. It looks an ideal task for data-processing, and yet it does not seem likely that punched cards can be used successfully. It would be difficult to finance a centre which would be contributed to by all countries, though many would be able to help by devoting scientific staff to the project for a few weeks each year. The ideal organisation seemed to be a small secretariat in one country, with contributors in each country where as much of the work as possible would be carried out. The Flora Europaea biennial Symposium took place in Denmark in August 1965, and on the afternoon of 10th August a meeting on Mapping the Flora of Europe took place in the Natural History Museum of Åarhus University to hear about the progress which had been made during the previous year. As a result of the evidence presented that satisfactory maps could be prepared, it was agreed that the scheme was practicable. It was decided that the area covered would, if possible, be the same as that covered by *Flora Europaea*.

The Flora Europaea Secretariat made it clear that, though they gave their blessing to the scheme, it would have to be a separate organisation, financed independently, though there would be the closest possible links between the two. It was agreed that a committee of about ten people, which would meet once or twice each year, should determine the way in which the scheme is organised, and that a Secretariat should be set up in one country to carry out the decisions of the Committee, and be responsible for the day-to-day affairs of the scheme. In view of the difficulties of finding botanists to map their own countries in the south, and the commitment of most Central European countries to national or regional schemes it seemed advisable that the Secretariat should be centred in northern Europe. It was clear that the centre could not be in Britain, which was already financing *Flora Europaea*; it was hoped very much that the Danish botanists might consider taking the responsibility, but this was not possible as all of them are heavily involved in current university expansion. However, we were very fortunate in finding that Prof. Jalas of Finland thought it might be possible to set up the centre in Helsinki, and that Dr. J. Suominen would be willing to become the permanent secretary. By mid-December it was learnt that the Finnish Government had agreed to finance the Secretariat, and Dr. Suominen visited England to take over all the documents relating to the scheme. It is to be hoped that the short distance between Helsinki and Leningrad will simplify the extraction of information from the U.S.S.R.

Before the Åarhus meeting ended a Committee was elected to include representatives of the major mapping schemes at present in progress in Europe, and those with considerable experience in this work. Those elected were Prof. P. Dupont (France), Prof. F. Ehrendorfer (Austria), Dr. J. Futak (Czechoslovakia), Prof. E. F. Galiano (Spain), Prof. J. Jalas (Finland), Prof. J. Kornas (Poland), Prof. H. Meusel (E. Germany) and Dr. F. H. Perring (United Kingdom). Two further members were co-opted at the first meeting of some of the Committee members the following morning, Prof. T. W. Böcher (Denmark) and Prof. E. Hultén (Sweden). In January Prof. D. A. Webb was nominated by Flora Europaea as their representative.

Prof. A. M. Kornas invited the Committee to hold its first full meeting in Poland in September 1966, and in the meantime the Committee agreed to map species that showed examples of a wide range of taxonomic, nomenclatural and status problems from Volume I of *Flora Europaea.* Twenty species were chosen including *Diphasium alpinum* aggregate and *Polypodium vulgare* aggregate.

Many problems about the scheme are yet unresolved. It will undoubtedly take twenty-five to thirty years to complete, though the first volume is likely to appear within the next five years. There is a great deal of field work to be done if the maps produced are to be adequate. Members of the Botanical Society of the British Isles could make a significant contribution, particularly if they are willing to work through countries in which maps schemes are currently being organised. It is for this reason that I am particularly pleased that Prof. Dupont is able to explain the organisation of the French scheme.

THE MAPS SCHEME FOR THE FRENCH FLORA

By P. Dupont
(University of Nantes)
(English translation by A. N. Gibby)

If the mapping of the vegetation of France is well advanced, such is not the case with the mapping of the flora. It is evident that the accurate distribution of our plants is not nearly so well known as that of the Northern European countries. The reasons for this are many. In the first place, the flora of France is much richer than, for example, that of the British Isles or of the Scandinavian countries; what differences exist between the flora of Northern France and that of the Côte d'Azur and between the flora of Brittany and that of the Alps! Furthermore, in our country, there are relatively few field botanists and, more especially, there are not many amateurs. Finally, the majority of our systematists specialise in the study of the floras of distant places (Madagascar, West and North Africa, etc.).

However, French botanists have always been interested in problems of distribution, but these have been mostly considered from the phyto-geographical angle.

The first proposals for distribution mapping, based on the grid system, were made by a French botanist. Rouy suggested these during the International Botanical Congress held in Paris in 1889. He had then proposed a system on a world-wide scale. The units of the network were quadrilaterals, whose dimensions, both in latitude and longitude, were a quarter of a degree. They were thus of a smaller scale than those adopted for the present European scheme. They had the disadvantage of presenting inequalities of dimensions and surface, according to the latitude.

This idea rapidly fell into oblivion. However, numerous distribution maps were published by various botanists. But these were principally of rare species or regional maps. Very few showed any really accurate distribution for France as a whole.

At a time when numerous countries of Northern Europe were bringing out noteworthy publications on their flora, it was becoming important that we should make up for lost time in this direction. That is why, in 1960, on finishing my work on the Atlantic flora of Europe, I had suggested that maps should be produced on the grid system. I had chosen a unit of very practical application, for it was based on the most usual types of maps published by the Institut Géographique National and also on the road maps most commonly used in France (the Michelin maps). But these divisions were not squares; they were rectangles of 10 by 14 kms. One sheet of the 1:50,000 I.G.N. maps corresponded exactly with four of these rectangles. I had thought that the advantage from the practical point of view would have compensated for the difficulty presented by this size.

Since then two new factors have had to be considered, one being the adoption of the Universal Transverse Mercator grid for the European scheme, the other the recent introduction on certain editions of the I.G.N. maps of this same system. On accepting these two facts, it became obvious that the best solution was to adopt the Universal Transverse Mercator squares for the French project. It must, however, be noted that no standard edition of a French map is based on this system. It appears only on the military editions. But these military maps are in no way secret; for, although they are unobtainable in ordinary shops, they can be readily purchased direct from the Institut Géographique National.

The chief kinds of French maps showing these squares on their military versions are the following:—

The map of scale 1:500,000 World Type 1404, which completes the British series on the same scale and bears a legend in English. The 100 km. squares are heavily outlined, the 10 km. ones more lightly. France is covered by 18 sheets. This map is the basic one for determining in which square one is working, without going into too many topographical details.

The map of scale 1:250,000 covering France in 46 sheets.

The 1:100,000, 1:50,000 maps of 1922, and 1:25,000. These have their 10 km. squares heavily outlined and those of 1 km. are more lightly delineated.

Not all of these maps have yet been published, but those whose scales are in the range of 1:100,000 to 1:500,000 will be very shortly.

The use of the Universal Transverse Mercator square is therefore the most convenient system for the French project. It will eliminate all difficulties involved in converting the French system into the European one, which is based on the 50 km. square. For the French project it seemed desirable to adopt a smaller unit. So the 10 km. squares were selected, coinciding with the squares of the British maps. Further, the square of the European project corresponds exactly with 25 squares of the French one.

It must be mentioned here that another system has been put forward for the North of France; that suggested by the Belgian botanists. It consists in the extension to the North of France of the grid used on the Belgian floristic maps, having 4 km. squares. This plan is interesting in that it represents equal areas in Belgium, Luxembourg and the neighbouring parts of France, Holland and Germany, all situated in a region of relatively uniform character. But is is impossible to extend it to cover the whole of our country. On one hand, the Belgian grid cannot be extended towards the South because of distortions due to projection. On the other hand, it does not feature on any French map, which is a great obstacle to its usefulness. Finally, the 4 km. squares which can quite well be used for the Belgian maps, where the flora is relatively poor, are really too small for the Southern parts, which are less well-worked and whose flora is much richer. I think that a friendly collaboration between Belgian and French botanists will enable both types of maps to be used.

Considering France as a whole, it would appear that the 10 km. square is the most convenient one to adopt. An experimental map showing the distribution of *Carduncellus mitissimus* enables one to see the extent and number of the squares involved. The squares shown correspond to the 100 km. ones. A hundred divisions of the network are to be found in the interior and the presence (of the plant) inside a 10 km. square is indicated by a symbol placed in the centre. Because of a change in the grid along the 0° and 6° meridians, some variations occur in the dimensions of the squares situated on either side of these meridians.

How will the mapping be done and how quickly? Publication in France will not be possible in the short time taken in the British Isles. For one thing, the flora is much richer and this increases the work. Another factor, a very important one, is that France does not possess the large contingent of amateurs which was so extremely valuable for the production of the British maps. Further, certain French botanists even consider that the task is impossible to achieve. But nothing is impossible when one sets about the work with determination!

The work will be carried out on an equal footing with the European project and 20 years should suffice to complete it. There are two chief points to consider: the collection of all the information available in publications, in floras and herbaria, and work in the field.

The former should be completed within ten years. I have started the work alone and this has enabled me to determine the best method to set about it. At present, thanks to assistance which is still very limited, I already possess fairly complete card indexes covering 25 departments, representing about a quarter of France. The work involved in card indexing needs much time and patience, but it presents no major difficulties; the questions of synonymy, the inexactitude of information in many localities are serious hindrances, but, on the whole, only to a limited extent. The examination of herbaria will, doubtless, present more problems. Concerning field work, I have, during the last five years, made some experiments before launching the scheme, within the framework of the first grid that I proposed. I set some of my students to work on listing the species in certain areas. These students were working for their examination called the "Diplôme D'Etudes Supérieures", which as a rule takes a year. Actually, some students, despite their lack of experience, were able to record up to 700 species in some squares. Sometimes more than three-quarters of these had not been previously listed accurately in the squares concerned. These preliminary researches have demonstrated the value of systematic recording, not only for species recorded in Floras as common, whose distribution was not accurately known, but also for rare species where new localities have been discovered.

I have myself examined many squares and important results have been obtained, as will be seen in forthcoming publications.

To facilitate the survey in the field, regional lists are being compiled. But there are some difficulties, because of the richness of the flora; either there will have to be more lists, or they will have to be much longer than the British ones.

What remains to be done is to urge the greatest possible number of botanists to carry out surveys for the production of these distribution maps. It is a fact that the French are strongly individualistic and various botanists will be reluctant, certainly at the start, to send in the lists they have made. But the results obtained in other countries have been so striking that I think the publication of preliminary maps will convince the majority of the value and the urgency of such work.

I also think, and it is my greatest hope, that many students, former students, grammar school teachers and any amateurs that still remain, will discover that they can collect plants with an interesting object in view and will feel that their botanizing can be most useful. This should revive in some botanists a taste for field botany, create a competitive spirit and perhaps result in the beginning of a revival of floristic botany in France, where, at present, it has become of very little interest, compared with 50 years ago.

As botanists in other countries, notably in Great Britain, are prepared to make surveys, their collaboration will certainly be accepted unreservedly. There are about 6,000 10 km. squares to investigate in France. There is thus work for everyone. It will be necessary to centralise information, as and when the work proceeds. The results will be collected at the Faculty of Sciences at Nantes in my laboratory (Laboratoire de Biologie Végétale et de Phytogéographie), where the maps will be completed as they come in. While the detailed lists are being compiled provisional information will be sent to those wishing to make surveys.

I have already mentioned that the publication of the maps will require about 20 years. In my opinion, this is the time needed to produce a complete atlas. But it will be possible for many maps to be published earlier than this, either on a regional basis or to illustrate the different types of distribution of species of the French flora.

NOTES AND KEYS OF PAPERS READ AT THE LOCAL FLORA WRITER'S CONFERENCE, BRISTOL, 1966

The following notes and keys are based on papers read at the local Flora Writer's Conference held at Bristol in September 1966. (See p. 412 of this part of *Proceedings* for a report of the conference.) The papers have been assembled by Dr. A. J. Willis.

INFRASPECIFIC VARIANTS

By D. E. Allen

There is a growing trend in local Floras to ignore, or at least neglect, all variants below the rank of subspecies. There are three reasons for this: —

1. The standard national Floras, whose taxonomic criteria the local worker tends to follow (perhaps over-slavishly), nowadays tend to omit all reference to minor variants. They are therefore assumed to be 'unworthy of scientific recognition' quite uncritically.
2. The very extensive information on this subject amassed by earlier generations still largely awaits balanced sifting and constructive collating. Its great potential value is thus unappreciated.
3. Descriptions of named variants are often hard to come by. Their nomenclature also tends to be confused, if not chaotic.

Local Flora work, however, has probably now more useful things to tell us about the incidence of minor variants locally than it has about distribution at the broad species level, at least as far as non-critical groups are concerned.

The five variants given below illustrate different aspects which study of such taxa can help to throw light on: —

Ballota nigra var. *mollissima* Druce (densely pubescent, virtually gland-free): a possibly indigenous race of a species otherwise now invariably adventive — its distinctiveness largely obscured by apparent extensive introgression with an alien and introduced related taxon.

Plantago coronopus var. *ceratophyllon* Rapin (more robust; scapes more ascending; leaves more ascending, broader, thicker; spikes longer): a variant with a marked regional trend in its Britannic range, made more meaningful when traced across on to the Continent—in this case probably a nothocline produced by introgression with the Mediterranean *P. macrorhiza*.

Iris foetidissima var. *citrina* Bromf. (corolla lemon-yellow with purple lines): a special regional mutant, apparently radiating outward from a single centre of origin (in this case Purbeck), presumably aided by some selective advantage.

Senecio jacobaea var. *discoideus* Wimm. & Grab. (corolla rayless): a mutant for no clearly apparent reason with a marked preference for a certain habitat (in this case sand-dunes), again presumably due to some selective advantage.

Senecio vulgaris var. *hibernicus* Syme (corolla rayed; plant subglabrous, well-branched): a mutant clearly in the process of spreading, apparently as an alien invading population.

POA PRATENSIS L., *P. ANGUSTIFOLIA* L. AND *P. SUBCAERULEA* SM.

By D. M. Barling

Following a brief review of the taxonomy of *Poa pratensis sensu lato* the problems of identifying *Poa angustifolia* L., *P. pratensis* L. and *P. subcaerulea* Sm. in rough grassland and more intensively cultivated permanent pasture were discussed. The importance of vegetative features in identification was pointed out.

The distribution of these species was particularly covered in two local floras, one on the calcareous soils of the Cotswolds and the other on the acid soils of north Glamorganshire. In both areas distribution is especially influenced by the biotic factor.

In the Cotswolds *P. angustifolia* is found on well-drained soils where poor cultivation has given rough grasslands where species such as *Bromus erectus* are abundant. *P. pratensis* L. is variable and the forms found in intensively grazed areas show morphological differences from those found in rough grasslands. In some Cotswold grassland communities *P. pratensis* and *P. angustifolia* are found together and as the flowering periods overlap it is likely that apomixis forms a breeding barrier. Some data on these sympatric populations were presented and the problem of classifying the *P. pratensis* plants was outlined.

In the hill areas of N. Glamorgan only *P. subcaerulea* has so far been recorded and it is commoner on areas of higher soil fertility within grasslands such as sheep shelters and road-sides. It also occurs on weathered tips of colliery waste, a habitat similar to sand-dunes in which it is often recorded.

KEY

Inflorescence a panicle with spikelets several flowered. Lemma with long hairs on the middle and outer lateral nerves.

Rhizomatous. Leafy tillers flat, leaves folded in the bud, slightly asymmetrical and with the margins more or less parallel, often with a slight indentation on the margins about $\frac{1}{3}$ from the apex; upper epidermis with motor cells ("tramlines") near the midrib. Margins terminating abruptly in a "boat-shaped" tip. Auricles absent, ligule present, leaf sheath entire.

1 Vegetative tillers with very narrow leaf blades, usually less than 2 mm. wide, and very long so as to appear bristle-like; hairy on upper surface. Tillers forming compact tufts from intra-vaginal tillering, with dead leaf bases obvious, rhizomes short and slender. Inflorescence a panicle on tall culms with the flag leaf short and broad contrasting with those of sterile tillers. Branches at lowest rachis node several, 3-4-5. Glumes unequal, smaller lower glume with single obvious nerve (vein). Panicles emerging early spring .... *Poa angustifolia*

Vegetative tillers with broad, more than 2 mm. wide, leaf blades; occasionally hairy, but normally glabrous. A fringe of hairs on the margins at the base of the leaf blade 2

2 Plants with tillers borne single on long spreading rhizomes. Occasionally 2-3 tillers. Lower margin of blade with obvious fringe of hairs. Whole plant often glaucous. Panicle short with largish spikelets and "heavy" in appearance and on shortish culms often occurring singly. Branches at bottom rachis node usually in pairs, sometimes single or 3+. Glumes more or less equal, acuminate, lower glume normally prominently 3 nerved. Often in mountain grasslands and sand-dunes .... *Poa subcaerulea*

Plants with tillers commonly in tufts and only sometimes single 3

3 Plants with tillers in tufts often a dark-green colour, rhizomes robust. Panicle on medium length culms. Several branches, 3-4-5 at lowest rachis node. Glumes unequal in size, lower glume with lateral veins poorly developed and so usually one nerved. Common in well cultivated pasture ... *Poa pratensis*

Plants often not clearly tufted at the base of the panicles. Foliage sometimes harsh. Glumes not as above and lower glume usually with well-developed lateral veins and so 3 nerved. Branches at bottom rachis node 2-3-4. Tillering variable in same habitat, with intra-vaginal tillering clear or absent. Common on rough grasslands of the Oolitic limestones, and on road verges, etc. ... *Poa pratensis* (ecotypes?)

ERODIUM CICUTARIUM AGG.

By P. M. Benoit

Andreas (1947) brought order to the *Erodium cicutarium* aggregate when she showed that it comprised two cytotypes, diploid and tetraploid, which alone she treated as full species as

E. glutinosum Dumort. and *E. cicutarium* (L.) L'Hérit. s.s. respectively. Larsen (1958) has since described a third, hexaploid, cytotype as *E. danicum* Lars. but that has not been found in the British Isles.

Yet this difficult group has continued to be misunderstood, owing to the variability of two morphologically similar species, to the wrong characters being used to separate them, and to their distinctness being obscured by the frequent triploid hybrid. It has been thought that a plant must be densely glandular with few very small (to 7 mm.) flowers to be *E. glutinosum.* But in fact glandulosity and flower size are useless characters, and *E. glutinosum* may be almost eglandular with 12 mm. flowers, 5 in an inflorescence; such plants were called '*E. neglectum*' by Baker & Salmon (1920) and are at present wrongly referred to *E. cicutarium* s.s.

Hybridisation experiments have confirmed the validity of Andreas's two species; there is an effective though not quite complete sterility barrier between them and introgression does not take place. But her subspecies *arvale* and *dunense* of *E. cicutarium,* which have been taken up in Britain, are unsatisfactory here and best rejected with such of the earlier segregates as *E. lebelii* Jord., *E. neglectum* Baker f. & Salmon, and *E. pimpinellifolium* Sibth.

KEY

1 Lvs. of fl. stems with dentate to shallow pinnatifid lflts. Carpel pits large, surrounded by a strong sharp-edged furrow and with numerous shining globular glands ...... *moschatum*
Lvs. of fl. stems with deeply pinnatifid (to midrib) lflts. Carpel pits without or with a weak furrow and without shining glands, or fr. not developed 2

2 Pollen grains very irregular in size (20-75μ) and colour (red to yellow) in the same anther. Fr. mostly undeveloped. Fls. large with persistent petals. Otherwise ± intermediate between *cicutarium* and *glutinosum* (see 3), and growing with them* .... *glutinosum* × *cicutarium*

Pollen grains uniform in size and colour. Fr. developed normally 3

3 Petals lt. purple (if whitish, a semi-albino with pale green stems, lvs., etc.), spotted or not; hairs at base 420-630μ. Expanded base of fertile filaments with sloping to squarish 'shoulders'. Pollen grains (dry) 56-62μ. Nectar glands with rounded to truncate apex. Carpels 5-6 mm., to top of beak

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*Not to be confused with stunted plants having small crumpled petals, poorly developed stamens with mostly indehiscent anthers, and no developed fr., but otherwise the characters of *cicutarium* or *glutinosum.* Apparently suffering from fungus attack. Common.

spiral 9-12 mm., deep rusty-brown; apical pits conspicuous, with a sharp raised rim surrounded by a glabrous ± furrowed zone, the hairs of the carpel body not projecting over the edge of the pit; beak (20 –) 23-30 mm. Seed (dry) 2·5-3·0 mm. $2n = 40$ .... *cicutarium s.s.*

Petals very pale lilac, unspotted; hairs at base 250-350μ. Expanded base of fertile filaments mostly with a tooth on one or both sides. Pollen grains (dry) 47-52μ. Nectar glands retuse. Carpels 4-5 mm., to top of beak spiral 7-9 mm., lt. grey-brown; apical pits minute and inconspicuous with neither a raised rim nor a differentiated outer zone, the hairs of the carpel body projecting over the edge of pit; beak 16-21 mm. Seed (dry) 2·2-2·5 mm. $2n = 20$ ...... *glutinosum*

The writer is grateful to Mr. R. H. Roberts of Bangor and the late Mr. N. Y. Sandwith of Kew, who generously shared their knowledge of these interesting plants.

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THE *RANUNCULUS PENICILLATUS* GROUP

By C. D. K. COOK
(The Hartley Botanical Laboratories, The University, Liverpool)

The *R. penicillatus* group requires further study and is a long way from being understood. In cultivation it is possible to recognize several different races but their phenotypic variation is so great that their detection in the herbarium and the field is impossible on gross morphological features. I recognize three varieties: var. *penicillatus,* var. *calcareus* and var. *vertumnus.*

The total variation pattern of *R. penicillatus* extends from strains that resemble *R. peltatus* to strains that superficially resemble *R. fluitans*. *R. penicillatus* may be separated from *R. fluitans* as it has a densely pubescent receptacle. At the other end of the variation spectrum it is occasionally difficult to separate *R. penicillatus* from *R. peltatus*. *R. penicillatus* is found in flowing water in streams, small rivers and canals.

R. PENICILLATUS var. PENICILLATUS (Dumort.) Bab., *Man. Brit. Bot.,* ed. 7, 7 (1874).

Syn.

Batrachium penicillatum Dumort., *Bull. Soc. Bot. Belg.*, **2**, 216 (1863).

R. aquatilis L. var. *pseudofluitans* Syme in Sowerby, *Engl. Bot.*, ed. 3, **1**, 20 (1863).

R. pseudofluitans Newbould ex Syme, *loc. cit.*, *nom. synon.* (not validly published).

R. pseudofluitans (Syme) Newbould ex Baker & Foggitt, *Thirsk Nat. Hist. Soc. Bot. Exch. Club, Cur. Rep.*, **1864**, 5 (1865); *J. Bot. Lond.*, **3**, 115 (1865).

DESCRIPTION

Long-lived perennial, stem up to 3 m. long. Leaves entire or divided into capillary segments. Entire leaves frequently lacking; stipules suborbicular to ovate, adnate to petiole for $\frac{3}{4}$ or more their length; petiole 50-80 cm. long; lamina up to 40 cm. wide, reniform to semi-orbicular, occasionally cuneate at base, 3- or 5-lobed; lobes cuneate, sinus $\frac{2}{3}$ or less the length of the lamina; margin entire, crenate, dentate or with capillary appendages. Divided leaves invariably present, exceeding internodes on mature stems; petiole 5-30 mm. long; lamina elongate-obconical, 7-20 cm. long, ultimate segments rarely more than 100, flaccid, fine, subparallel. Peduncle in fruit 50-100 mm. long, usually longer than the petiole of the opposed entire leaf. Sepals 3-7 mm. long. Petals (5) 10-15 (20) mm. long, broadly obovate, contiguous during anthesis; nectar-pits elongate, more or less pyriform. Stamens (8) 20-40. Carpels (15) 50-80, hairy or glabrous; style lateral to subterminal. Receptacle distinctly hairy, remaining globose in fruit.

R. PENICILLATUS var. CALCAREUS (R. W. Butcher) C. D. K. Cook, *Mitt. Bot. Staatssam. (München)*, **6**, 158 (1966).

Syn.

R. calcareus R. W. Butcher, *The Naturalist (Yorkshire)*, **1960**, 125 (1960).

DESCRIPTION

Like var. *penicillatus* but divided leaves obconical in outline, equal to or shorter than mature internodes; segments rigid or flaccid, slightly divergent, much branched, with up to 150 ultimate segments.

R. PENICILLATUS var. VERTUMNUS C. D. K. Cook, *Mitt. Bot. Staatssam. (München)*, **6**, 160 (1966).

DESCRIPTION

Like var. *penicillatus* but lacks entire leaves; divided leaves globose to ensiform, shorter than mature internodes; segments rigid, widely divergent, much branched, with more than 200 ultimate segments.

EXPERIMENTAL TAXONOMIC STUDIES OF *HERNIARIA* FROM BRITAIN AND BRITTANY

By L. C. Frost
(Department of Botany, University of Bristol)

Babington (1839, p. 39) distinguished *Herniaria glabra α vera* with glabrous leaves at St. Aubin's Bay, Jersey, L'Ancresse Common, Guernsey, and in Alderney together with *H. glabra β subciliata,* having leaves with small cilia, in very small quantity at St. Aubin's Bay, Jersey. The latter specimens are in Herb. CGE and to the sheet Babington had added a plant with long, narrow leaves collected near the Vale Church, Guernsey. Pugsley (1914), who it appears did not examine Babington's original specimens, pointed out that all the Channel Island material was referable to *H. ciliata* Bab. Pugsley added that Babington's varietal name could hardly be adopted for a plant which at that time was both his type and variety and so Pugsley substituted the name *angustifolia* and added that a specimen collected in 1840 by W. Borrer at Ruan Minor, Cornwall, was also referable to this variety. Melderis (1957) substituted the names *H. ciliolata* Meld. and *H. ciliolata* var. *angustifolia* (Pugsl.) Meld. In view of the above evidence the varietal name "angustifolia" is incorrect.

Transplant experiments have revealed wide variation in growth habit, internode length, leaf shape and size and in degree and distribution of cilia on the leaves, stems and sepals in material from Cornwall, Guernsey and Brittany, whereas Jersey material from St. Brelade's Bay showed less variation and the general facies of these plants separates them from all others.

Experiments on the breeding system indicated that plants from Cornwall, Guernsey and Brittany were self-sterile. Ants are the main cross-pollinating agents. In contrast, Jersey plants showed some self-fertility. The resulting selfed progeny showed less variation between individuals than naturally crossed progeny grown from seed collected from single plants at the Lizard. Pilot experiments have indicated that it may be possible to raise artificial hybrids between Jersey plants and plants from other areas.

Chromosome preparations of seven different plants from the Lizard and Guernsey, including plants with long, narrow leaves and a plant with thick stems, have shown 36 bivalents at diplotene-diakinesis whereas eight different plants from Jersey and Brittany, including plants from Brittany with no cilia on the upper leaf surface or outer sepal surface, showed 54 bivalents in each case. Preliminary determinations of the total DNA content of nuclei in meiotic material using the Barr and Stroud integrating microdensitometer have given, for Jersey and Brittany material, similar values which are significantly greater than the similar values for both Guernsey and Lizard material thus supporting the chromosome counts.

Examination of herbarium specimens indicated that the main morphological differences allowing separation were stem diameter and the length and breadth of mature leaves: the Jersey variety generally has thinner stems and longer, narrower leaves than specimens from Cornwall or Guernsey. Recently a plant with thin stems and long, narrow leaves has been collected in Brittany. Further studies of this plant, particularly its chromosome number, may reveal whether the Jersey variety is endemic or reached that Island from the French mainland.

From the account above, the claims by Marquand (1901) and Thurston and Vigurs (1922) for *H. ciliolata* var. *angustifolia* (Pugsl.) Meld. cannot be substantiated. Observations in the field and in the experimental material have revealed plants with a few cilia on the upper surface of the leaves in Cornwall and Guernsey and on the outer surface of the sepals at the Lizard. A plant with thick stems was found in Guernsey. All these features are characteristic of *H. maritima* Link (Melderis, *loc. cit.*). On the other hand, several specimens from Brittany lack cilia on the upper surface of the leaves or outer surface of the sepals but all (with the exception above) have thick stems. It would appear that the characters used in the separation of *H. ciliolata* and *H. maritima* require some revision.

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THE SPICATE MINTS

By R. M. HARLEY
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THE SPECIES

Of the six species of mint occurring in Britain, only two qualify as spicate mints, with a spike-like inflorescence. These are:—

Mentha suaveolens Ehrh. (=*M. rotundifolia* auct., non L.) and *M. spicata* L. However, *M. longifolia* (L.) Huds. has long been erroneously recorded as a British plant and will also be considered.

Mentha suaveolens

Diploid ($2n=24$). Lowland species of Western and Southern Europe and the Mediterranean region. Apparently native in S. and S.-W. England, and S. Wales, but a garden escape elsewhere.

Mentha longifolia

Diploid ($2n=24$). Montane, semi-aquatic species occurring in all the main mountain regions from N.-W. Africa and S. Europe eastwards through Asia to the Himalayas, and southwards from Egypt through East Africa to the Cape. Absent from N.-W. Europe and the British Isles. A variable species which is differentiated into several geographical races.

Mentha spicata

Tetraploid ($2n=48$). A species of cultivation often found as a garden escape. Introduced and now distributed throughout the world. An extremely variable and polymorphic species which appears to be a segmental allopolyploid derived from the two preceding species.

Hairiness is controlled by a single gene, hairiness being recessive to glabrousness. In the past, hairy forms have frequently been confused with *M. longifolia.*

Odour is also variable. A single gene controls the presence of either carvone or menthone in the essential oil. The former gives the characteristic odour of spearmint, and the latter of peppermint. Either may be overlaid by a sickly or musty smell due to the presence of other compounds. The menthone form is rarely found in Britain, but it is this form which is parental to the cultivated peppermint.

General morphology is also variable, and some individuals of *M. spicata* are close in appearance to one or other of the diploid species. This often makes it impossible to distinguish some forms of *M. spicata* from its hybrids with either *M. suaveolens* or *M. longifolia,* except on fertility criteria. The hybrids are triploid and highly sterile. For this reason plants identified as *"M. × niliaca", "M. × cordifolia"* and *"M. × villoso-nervata"* will require careful reassessment.

Rugose leaved examples of *M. spicata,* which are close to *M. suaveolens* in general appearance, are not uncommon in the South-West. These occur in both hairy and glabrous forms, and probably deserve varietal recognition. They were formerly included, together with actual hybrids, in the taxon *M. × cordifolia* Opiz var. *brevifolia* Fraser.

Collection and Identification

For herbarium material, specimens should consist of a well-grown main stem, with a well-developed inflorescence with flowers and fruit. The middle and lower main stem leaves should still be present. Side shoots are atypical, as are shaded specimens or those suffering from drought, and should not normally be collected. If the plant has included anthers and appears to be sterile, note whether there are any mints with exserted anthers within pollinating range. Never collect an 'odd' specimen in isolation; if there are other mints growing nearby, they may provide a clue as to its origin.

Hybrid mints are of frequent occurrence. Most of those involving *Mentha spicata* are of garden origin, and have escaped from cultivation. Alternatively many mints such as *Mentha* × *piperita* (*M. aquatica* × *spicata*) occur spontaneously. The glabrous or subglabrous plants with a pungent odour are probably all cultivated forms (Peppermint was at one time widely grown in Britain). Many of the hairy forms, however, are rather different in appearance and some have no peppermint odour. These are almost certainly spontaneous hybrids, and occur much less frequently.

Included anthers are often taken as a sign of hybridity. This is not, however, a reliable test. Male sterility of this type is a common feature in many Labiatae, and is a mechanism that ensures cross-pollination. Male sterile individuals are frequent in all the British species of mints, and hybrids can be found with exserted stamens.

With experience, the species can be recognised in the field, although microscopic characters are necessary for certain identification. The main difficulty usually lies in separating *M. spicata* from its hybrids, and here fertility is an important character.

The following synopsis gives the most reliable biometric characters for separating the three species.

Anther length: The following measurements were made on exserted anthers from herbarium material.
Nutlet length: Abnormalities may be found if any of the complement of four nutlets have failed to develop.
Leaf Hairs: These are hairs shaved from the underside of mature leaves. The hairs may be branched or simple.
Basal Cell Diameter: This measurement is made on the basal cell of the leaf hairs (mean of ten readings).

	suaveolens	*longifolia*	*spicata*
Leaf Hairs	branched	simple	some branched hairs usually present
Basal Cell Diam.	43-57μ	18-33μ	30-47μ
Anther Length	0·28-0·38 mm.	0·28-0·38 mm.	0·38-0·52 mm.
Nutlet Length	0·57-0·75 mm.	0·54-0·79 mm.	0·74-0·94 mm.

PROVISIONAL FIELD KEY TO SOME BRITISH SPICATE MINTS

The following field key does not account for the considerable variation found in the group and should be used with caution. I would be grateful for comments from anyone who uses it.

1 Leaves glabrous or sparsely hairy beneath 5
Leaves hairy beneath 2

2 Plant with spearmint odour (may be overlaid by musty smell) 5
Plant without spearmint odour 3

3 Plant with usually apple green strongly rugose leaves with floccose indumentum beneath, often with leaves sparsely hairy above. Leaves rotund, broadly ovate or oblong with blunt apex. Leaf teeth strongly reflexed (except in shade) giving leaf margin crenate appearance. Corolla usually white .... *suaveolens*

Plant never with all the above characters, usually with lanceolate lvs. often smooth or slightly rugose with more acute apex. Lvs. often more coarsely toothed, with spreading teeth. Corolla white, pink or lilac 4

4 Leaves softly tomentose, dove grey or grey-green above and below or sometimes white tomentose below. Lvs. often coarsely and unevenly toothed, usually narrowed at the base, and widest at or above the middle of the leaf, never rugose. Corolla lilac or rarely white .... *longifolia*

Lvs. greener less softly hairy, with smaller more regular teeth. Leaves somewhat rugose, with the widest point below the middle of the leaf. Corolla pink, white or lilac .... (*M. spicata* or hybrids) 5

5 Fertile seed produced (or plant may be male sterile and have no pollen donor in the vicinity) .... *M. spicata* 6

No fertile seed .... *M. spicata* hybrids

6 Lvs. ovate or ovate oblong, very broad, strongly rugose. Infl. much branched, corolla white. Habit of *M. suaveolens*, frequent in the South-West .... *M. spicata* (rugose variety)

Not with the above combination of characters ...... *M. spicata*

THE GENUS *DACTYLORHIZA* IN BRITAIN

By P. F. Hunt and V. S. Summerhayes

The marsh and spotted orchids, like the majority of the relatively recently evolved orchid family, are still more or less in a process of speciation. They have not settled down yet to a life in which each species has its own ecological niche; several species may grow together in the same or closely-related habitats and all have a remarkably wide tolerance of varying soil conditions. Being not fully differentiated and living in close juxtaposition they hybridise freely and it is often a problem to be sure whether one has, for example, two species with hybrids or one highly variable species.

All we can do is to select those plants showing the most constant combinations of correlated characters, call them species and everything else hybrids. The problem is to recognise these so-called "species" and to remember their character combinations so that the existence and origin of any hybrids can be ascertained readily. This is the reason why we find it sometimes impossible to give a hybrid identification to an isolated specimen especially when we have no information as to the population from which it came. Some idea of the "species" present in the population or area would be a great help—it is not enough to say that it was the only one found like it in the population. If one gets to know the "species" in an area, before long any plant of hybrid origin will become quite obvious and armed with local knowledge the "parents" can be deduced fairly accurately. However, it is important to remember that new characters can apparently arise in hybrids, e.g. increased height or denser spotting.

There is a further category which for convenience we call subspecies. Certain groups of characters are more correlated than in hybrids but less so than in "species"; the plants with these often rather ill-defined characters can be geographically differentiated and we call them subspecies, e.g. *D. fuchsii* subsp. *okellyi*. Occasionally some populations have more immediately obvious characters, e.g. colour, and if these are ecologically differentiated we have ecological subspecies, e.g. *D. incarnata* and its subspecies. Some interspecific hybrids tend towards one parent and are often classified as subspecies.

It should be remembered, however, that what we are trying to do is to impose a classificatory system on to objects which as yet are not fully differentiated into classes.

Key to British species of Dactylorhiza

1 Lateral sepals spreading widely or drooping; flowers white, pale or medium pink or pale magenta-pink or lilac, with darker lines, loops or dots on labellum and petals, stem solid, leaves usually spotted, spur slender, 2 mm. or less in diameter; labellum broad, 3-lobed in lower half 2

Lateral sepals ± upright, backs often touching; flowers flesh-pink, madder-red, pale magenta, magenta-purple with darker markings on labellum and petals, or pale creamy-straw coloured; stem often with central hollow; leaves spotted or unspotted; spur rather stout, over 2 mm. in diameter, often ± conical 3

2 Middle lobe of labellum longer than side-lobes or all 3 equal in length; lowest leaves broadest and very blunt or rounded at apex, usually progressively narrower and more acute, total number 7-20, usually with numerous round or elliptic purplish black spots which are often wider at right angles to length of leaf, silver-grey on under surface, spur 1·5-2 mm. in diameter .... *fuchsii*

Middle lobe of labellum much smaller and usually shorter than side-lobes; all leaves rather narrow and acute, total number 5-12; spots on leaves often rather faint or obscure, not broader at right angles to length of leaf; spur 1 mm. or less in diameter .... *maculata*

3 Leaves unspotted 4

Leaves variously spotted 11

4 Leaves erect, yellow-green, narrowly hooded at apex; stem very hollow; labellum variously coloured, usually with distinct double-loop markings, sides strongly reflexed, spur stout, tapering towards apex 5
Leaves ± spreading, deep or greyish green, not or broadly hooded at apex; stem solid or narrowly hollow; labellum scarcely lobed or distinctly 3-lobed, sides not usually much reflexed 7

5 Labellum not lobed; red or purple pigment present 6
Labellum 3-lobed; no red or purple pigment present; flowers pale creamy-straw coloured ...... *incarnata* subsp. *ochroleuca*

6 Labellum flesh-pink .... *incarnata* subsp. *incarnata*
Labellum madder-red .... *incarnata* subsp. *coccinea*
Labellum magenta or purple ...... *incarnata* subsp. *pulchella*

7 Leaves narrow, rarely more than 2 cm., few, usually 3-5, labellum longer than broad, wedge or kite shaped, broadest in front, ± 3-lobed with middle lobe somewhat projecting ... *traunsteineri*
Leaves broad, usually more than 2 cm., numerous, usually 5 or more; labellum usually broader than long 8

8 Labellum large with small dots or indistinct loops; flowers lilac-pink, magenta-pink or pale magenta; tall plants 25-60 cm. high; large lanceolate leaves 9
Labellum small with heavy loop or broken line markings; flowers dull purple to bright magenta (rarely pink) 10

9 Leaves fresh or deep green, ± erect; labellum not much lobed, spots on labellum fine, nearly all in centre, sometimes forming indistinct central loops .... *praetermissa*
Leaves bluish green, rather spreading, labellum distinctly 3-lobed, spots on labellum distributed all over, forming an indistinct line about middle of each side .... *kerryensis*

10 Labellum not or only slightly equally 3-lobed, often broadly diamond shaped, and magenta or bright magenta with heavy broken loop, dash or hieroglyphic markings, leaves broadly hooded at apex, plants up to 45 cm. high .... *purpurella*
Labellum usually distinctly 3-lobed, with middle lobe long and pointed but sometimes side-lobes indistinct, dull purple with broken loop or line markings, leaves not hooded at apex, plants up to 25 cm. high .... *kerryensis*

11 Spots on both sides of leaves rather variable in size and numbers, upper part of stem with red streaks; flowers small, pinkish-purple; labellum broader than long, not much lobed, sides not much reflexed, with irregular loop markings ...... *cruenta*
Spots on upper surface of leaves only 12

12 Leaves narrow, rarely more than 2 cm., few, usually 3-5, labellum longer than broad, wedge or kite shaped, broadest in front, ± 3-lobed with middle lobe somewhat projecting; leaf spotting sparse, solid or ring spots .... *traunsteineri*
Leaves broad, usually more than 2 cm., numerous, usually 5 or more, labellum usually broader than long 13

13 Spots on leaves nearly always ringed, often very numerous; plant tall, up to 75 cm. high, with broad leaves; flowers pink or magenta-pink with very heavy broken loop or line markings on labellum and petals .... *praetermissa*
Spots on leaves not ring-like 14

14 Spots on leaves very small, dot like, usually towards apex; flowers bright magenta with heavy broken line markings on labellum; labellum broadly diamond shaped; leaves hooded at apex .... *purpurella*
Spots on leaves often very heavy and close; flowers dull purple or magenta with variable markings; labellum broader than long, either 3-lobed with middle lobe long and pointed or almost entire but pointed in front; leaves not hooded at apex .... *kerryensis*

CAREX SECTION *CAREX* (=*ACUTAE* FR.)

By A. C. Jermy
(British Museum (Natural History))

The six British species included in the Section *Carex* are characteristically plants of wet habitats with thin, bluish-green faintly glaucous leaves, florets with two stigmata and black or dark-brown female glumes with distinct green or pale midrib. Their close morphology and aneuploid chromosome numbers ($n = 30\text{-}42$) suggest that there may be considerable pairing between species but this has not been proved because of the small size and ovoid shape of meiotic chromosomes. It is suggested that a number of hybrids, especially *acuta* × *aquatilis, acuta* × *elata, acuta* × *nigra, bigelowii* × *nigra, elata* × *nigra,* are at least partly fertile and more common than hitherto thought, accounting for much of the variation seen in these sedges.

The following characters are used in the identification of the taxa involved. For the most part vegetative characters can be used provided the variation the habitat may impose is taken into consideration.

Habit: the presence or absence of pioneer (leading) rhizomes is important. The one species without such rhizomes (*C. elata*) is a tussock-forming plant but false tussocking may result when rhizomatous plants of *C. nigra* grow in wet stagnant conditions (e.g. fen lagg). In this case the leading rhizome grows upwards to the higher concentration of oxygen (this directional growth has been proved experimentally) and so tussocks or islets of sedge peat are built up (which are often complete mixed-fen communities); an example of this is seen in the fen at Tarn Moss, Malham. Such tussocked *Carex* has often been quoted in ecological literature as *C. juncella* Fr., e.g. in Holdgate (1955, p. 395), on Sunbiggin Tarn, Westmorland, but bears no resemblance to that species as seen in Scandinavia. Kükenthal named this form var. *subcaespitosa* Kük., and Tutin queried its status as a species at a B.S.B.I. Exhibition Meeting in 1953; it has no taxonomic significance.

RHIZOME SCALES AND LEAF SHEATHS: the colour of these can be important and whilst this may be leached out in very wet conditions (or the sheaths may decay more rapidly in some habitats) there is usually some characteristic colour to be found above the water level. Whether or not the leaf sheaths split to form a ladder-like net-work of fibres (fibrillae) (as in *C. elata*) is a good spot-character regardless of habitat.

STEM: the shape (in cross section) of the culm is a character that does not change with habitat. The brittleness (due to extra silica cells?) is marked in one species (*C. aquatilis* Wahlenb). The absence of cuticular teeth on the stem angles of this species is a useful criterion; but in the other species there is a tendency for them to rub off lower down the stem as the plant ages.

LEAF: leaf shape, i.e. the abruptness with which the apex tapers, is a factor of length and therefore growth. In small low growing species, e.g. *C. bigelowii,* the apex tapers noticeably whereas if this species and other marsh species are grown in lush shady conditions the tapering is very gradual. Leaf width is increased in *C. nigra* at least by addition of phosphate. Epidermis, stomatal and cuticular patterns can be constant and taxonomically useful.

INFLORESCENCE: length of inflorescence must always be regarded in relation to the length of the whole culm. It is a general rule that the lower the spikelet is produced on the culm the longer will be the subtending bract and the more pedunculate and longer that spikelet. It is normal for species to have a fixed ratio of stem/inflorescence length but abnormalities can occur (e.g. through the damaging of a growing point by grazing) taking a species from one category to the next.

MALE SPIKELETS: variations in colour (from light-brown to red-brown-to-black) have no taxonomic significance. Actual numbers reflect size of inflorescence, i.e. there are more in those species with longer inflorescences.

FEMALE UTRICLES: the shape and size are slightly variable and of no infraspecific significance; fruit maturation must be taken into consideration but no change in either size or shape of utricle occurs after fertilisation. Nervature is more pronounced in *C. elata* but other species may well show utricle ribbing on drying. In this latter species too the fruits are caducous early in the summer.

FEMALE GLUMES: the length of these in relation to utricle appears to vary considerably but is more often due to relative positions of insertion on the spikelet axis rather than actual length. In some genotypes the glume is inrolled at the apex and appears cuspidate and rigidly sticks out from the utricle giving the spikelet a prickly appearance (best seen in *C. acuta*).

BRIEF DESCRIPTION OF THE BRITISH SPECIES

Carex acuta L.

Tufted plant of river-sides and ponds with fluctuating water tables; with long pioneer rhizomes; basal scales and sheaths brown, often soon decaying.

Stem acutely triangular, leafy at base, rough below inflorescence. Leaves and lower bracts 3-5 mm. wide.

Inflorescence one-quarter of culm length; female spikelets 4-8 cm. long; lowest bract twice as long as inflorescence; male spikelets several.

Carex nigra (L.) Reichard

A rhizomatous, ubiquitous plant of marshes and all wet places with high base content; with pioneer rhizomes; basal scales brown or slightly reddish, sheaths blackish or grey-brown. Leaves and lower bracts 2 mm. or less.

Inflorescence one-quarter or one-fifth length of culm; female spikelets compact, 1-2 cm. long, not pedunculate, lowest bract rarely reaching top of inflorescence; male spikelet 1 or 2.

Carex aquatilis Wahlenb

A rhizomatous plant of mesotrophic bogs in northern and alpine regions; basal scales and sheaths dark or orange-red.

Stems leafy below, brittle, distinctly trigonous-terete, smooth throughout.

Inflorescence one-quarter length of culm, female spikelets 3-5 cm. long, pedunculate and usually few-flowered at base; lowest bract well overtopping inflorescence; male spikelets several. It is suggested that many of the lowland and southern records for this species are crosses with *C. acuta* or forms of that species that need further investigation.

Carex recta Boott

A rhizomatous plant of estuarine marshes of limited distribution in Britain, with one leading rhizome; basal scales and sheaths red and brown.

Stems leafy in lower half.

Inflorescence congested, one-sixth length of culm; female spikelets 4-6 cm. long, often pedunculate and few-flowered at base, basal florets with aristate glume; lowest bract well overtopping inflorescence; male spikelets several.

Carex elata All.

A tussock-forming plant of swamps and dykesides with no pioneering rhizomes; basal scales pale brown, sheaths forming ladder-like fibres (fibrillae) on splitting.

Inflorescence only one-seventh length of culm; female spikelets 2-4 cm. long, compact, sessile, with elliptic, nerved fruits, 3-4 mm. long which are caducous on maturing; lowest bract shorter than inflorescence; male spikelets one or two.

Carex bigelowii Torr.

Plant of sub-alpine wet (*Rhacomitrium*) heaths and cliff-ledges rarely below 2000 ft. except in extreme west, with often two leading rhizomes or apparent monopodial growth; basal scales persistent, shining, orange-red-brown.

Leaves 2-3 mm. wide, arcuate, stiff, shorter than stem. Inflorescence one-quarter or less of culm; female spikelet *c.* 1 cm. long with bract usually much shorter than inflorescence; male spikelets one or two.

Ecological observations are very valuable. An attempt to define infraspecific categories for use by Local Flora Writers would mean defining virtually each population and then finding the correct name for it. Rather it is suggested that observers note the variation of well established populations in terms of the characters used here and thereby list the distribution of characters instead of the distribution of predefined taxa. Such information would give us a better idea of the status of the intermediate forms.

KEY TO CAREX SECTION CAREX

1 Plants caespitose with no pioneer (long extending) rhizomes; leaf sheaths splitting to form fibrillae .... *elata*
Plants always with pioneer rhizomes, although stagnant conditions of habitat may prevent them from spreading far; leaf sheaths membraneous not forming fibrillae on splitting 2

2 Inflorescence usually much less than $\frac{1}{4}$ the length of the entire culm; bracts subtending spikelets 1-2 mm. wide, not or only just overlapping inflorescence; leaves rarely over 2 mm. wide and if so then 5-15 cm. long and arcuate 3
Inflorescence $\frac{1}{4}$-$\frac{1}{2}$ length of culm; bracts conspicuously overtopping the inflorescence usually more than 2 mm. wide; leaves usually 3-5 mm. wide 4

3 Plant not obviously tufted with a single, leading rhizome from any one node; stems stiff, thick, standing above the recurved abruptly tapered leaves .... *bigelowii*
Plant tufted (not tussocky unless in stagnant fen), at least some nodes producing two leading rhizomes; stems slender, no longer than the gradually tapered leaves .... *nigra*

4 Inflorescence $\frac{1}{5}$ of culm length, crowded and all spikelets overlapping; female glumes of the lower florets of a spikelet aristate or at the least mucronate .... *recta*
Inflorescence at least $\frac{1}{4}$ culm length, with lowermost spikelet often distant and pedunculate; female glumes not mucronate or aristate 5

5 Female glumes acute, stiff, often recurved giving spikelet a prickly appearance; leaf sheaths only faintly tinged with red if at all; stem not brittle, rough below the inflorescence and acutely triquetrous .... *acuta*
Female glumes rounded, adpressed to utricle, at least some sheaths red or orange-red; stem brittle, usually breaking when folded in collection, smooth below inflorescence, trigonous-terete .... *aquatilis*

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THE BRITISH SPECIES OF *ULEX*

By M. C. F. PROCTOR

(a) *Ulex europaeus*

Generally easily distinguished from *U. minor* and *U. gallii* by its flowering season ((Sept.-) March-May (-June) as against (July-) Aug.-Oct. (Dec.)), hairy calyx and broader bracteoles, and habitat (heath margins, open woodland, scrubby grassland, sea-cliffs). A spring-flowering *Ulex* can safely be identified as *U. europaeus*; autumn flowers of *europaeus* are normally accompanied by numerous brown furry buds, while late flowers of *minor* and *gallii* are accompanied by withered flowers.

Hybrids between *U. europaeus* and *U. gallii* occur widely where the parents grow together. They are generally intermediate in characters, and flower in autumn and winter.

(b) *U. minor* and *U. gallii*

These two species fill much the same ecological niche, and have a comparable range of habitats, typically in extensive areas of heath or (in the case of *gallii*) acid hill grassland. Both are extremely variable and plastic in vegetative characters.

They are most easily separated by the lengths of the flower parts, which provide a reasonably sharp discontinuity. Most flowers of *minor* have a standard-length less than 12·0 mm. and a calyx-length of less than 9·5 mm.; the corresponding lengths are greater than these figures in *gallii*. Calyx-length, which scarcely changes between anthesis in late summer and dehiscence of the pods in the summer following, is the more generally useful character. Identification by single measurements is likely to result in 5-10% of misidentifications; the mean of ten measurements will almost always place a plant unambiguously.

The two species differ in flower-colour, though not sufficiently for easy identification. The relative length of the wings and the keel is *not* a good character; much *minor* in the New Forest and elsewhere has strongly curved wings longer than the keel.

U. minor ranges in height from *c.* 5-150 cm., and *U. gallii* from *c.* 10-200 cm. This difference in vegetative size, and characters of the length and rigidity of the spines, are only of value for identification when plants from closely comparable habitats are considered—or on the rare occasions when the two species grow together. Flower size is much less plastic than size of vegetative parts, but it is slightly affected by vegetative vigour. It is helpful to remember that a *small* plant with flower parts of borderline size, growing in short open heath, is likely to be *gallii*; a *large* plant with flowers of borderline size, growing on a roadside or in a woodland clearing, is likely to be *minor.*

U. gallii is predominant in the area west of Dorchester, Salisbury, Oxford and Sheffield (and near the East Anglian coast); *U. minor* is predominant in the south-east.

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RECOGNITION OF *CALLITRICHE* SPP. IN BRITAIN

By J. P. SAVIDGE

Little difficulty should be experienced in the identification of the British species of *Callitriche,* providing the specimens are flowering and/or fruiting, although in a few cases the use of a microscope may be necessary to confirm correct determination. The main purpose of this short synopsis is to indicate the most satisfactory characters by which each species can be recognized.

C. hermaphroditica L. (*C. autumnalis* L.) and *C. truncata* Guss. are very distinct from the other British species of *Callitriche* in that their leaves are without stomata and pellucid glands, their flowers are without bracts, and they have a basic chromosome number of $x=3$ instead of $x=5$. They have only linear leaves, which are usually less than 17 mm. long, and grow completely submerged. It is usually easy to separate the two by their fruits, that of *C. truncata* being distinctly broader than long with rounded mericarps, whereas the fruit of *C. hermaphroditica* is as broad as long and distinctly winged. *C. truncata* usually has shorter (less than 10 mm. long) pale green leaves as against the somewhat broader, darker leaves of *C. hermaphroditica.* The latter species is northern in its distribution, whereas *C. truncata* is a southern species. Only in the Midlands are the two likely to be found growing together, although as yet they have not been recorded in the same locality.

C. hamulata Kütz. is readily distinguished by the possession of 12- and 16-celled pellucid glands as against the 4- or 8-celled glands found in the remaining species. Its fruit is small, usually black when mature, about as long as broad, with the reflexed styles closely adpressed to the lateral sides. The stamens are usually less than 2 mm. long and the anthers are creamy-white. In fast-flowing or deep water the linear leaves are characterized by their 'calliper'-shaped tips, the tips of the emarginate apex first curving outwards and then finally converging. However, in some habitats the submerged leaves have simple emarginate apices.

C. obtusangula Le Gall is a lowland species and can often be recognized by its many leaved rosettes with the rhomboid-spathulate leaves tending to push the apex above the level of the water. Good diagnostic characters are the pollen grains, many of which are at least twice as long as broad; the large cream coloured anthers on filaments 5 to 9 mm. long; and the longer than broad fruit with rounded mericarps and more or less persistent long (4 to 8 mm.) styles. The bracts in this species are often conspicuous, being up to 1·5 mm. long and persistent.

The two species which are most likely to cause trouble in identification are *C. stagnalis* Scop. and *C. platycarpa* Kütz., and extra care should always be taken to avoid misidentification. If possible, one should use a combination of characters rather than relying on just one character. The main differences are:

CHARACTER	*C. stagnalis*	*C. platycarpa*
leaf length/leaf width ratio	between 2 and 3	usually at least 3, often 4 or more
bracts	usually deciduous	normally persistent
stamens	usually less than 3 mm. long	usually more than 3 mm. long
anthers	cream, almost 100% of pollen viable	yellow, some pollen inviable
pollen size (mean)	21μ	25μ
styles	rarely more than 3 mm. long	usually 4 mm. or longer
fruit	distinctly winged mericarps	mericarps keeled or slightly winged
chromosome number	$2n=10$	$2n=20$

C. platycarpa is widespread, but is confined to land below about 500 ft., whereas *C. stagnalis* is common, especially on mud and in shallow water, up to 3,000 ft. When submerged, *C. stagnalis* retains its ovate leaves; but *C. platycarpa* produces linear 1-veined leaves up to 30 mm. long when in fast-flowing or deep still water.

C. platycarpa rarely produces abundant fruit and some colonies seem to be virtually sterile. This is in marked contrast to *C. stagnalis* which is usually very fertile, except when growing submerged.

Hybrids are very rare, although at least four of the species may be found growing together. So far, I have not come across any authentic British material of *C. palustris* L., but I have seen herbarium sheets which suggest that *C. polymorpha* Lønnr. may occur in the British Isles. I should be very pleased to hear from anyone who finds *C. platycarpa*-like plants with fruit obviously broader than long and less than 1 mm. in length.

KEY TO SPECIES OF CALLITRICHE OCCURRING IN BRITAIN

1 Flowers without bracts; leaves without pellucid glands and stomata; plants completely submerged with linear leaves less than 17 mm. long and 2 mm. wide 2
Flowers with two bracts (in *hamulata* and *stagnalis* these may be inconspicuous as they are less than 0·5 mm. long); leaves with pellucid glands and usually with stomata; plants submerged or terrestrial, if submerged then leaves usually more than 17 mm. long and/or 2 mm. wide 3

2 Fruit distinctly broader than long, 0·9-1·2 × 1·1-1·5 mm., the mericarps with rounded outer margins; leaves light green, 5-10 (-13) mm. long, with more or less parallel sides . *truncata*
Fruit about as broad as long, 1·2-2·7 × 1·2-2·7 mm., the mericarps distinctly winged in lake forms, but only keeled in canal forms; leaves dark green, (5-) 7-17 (-20) mm., becoming slightly broader towards the base .... *hermaphroditica*

3 Fruit distinctly longer than broad, 1·3-1·8 × 1·1-1·4 mm., broadest at the middle, the mericarps with rounded outer margins; about 70% of pollen at least twice as long as broad; anthers pale cream, about 1·7 mm. wide .... *obtusangula*
Fruits not distinctly longer than broad; no pollen twice as long as broad; mericarps with winged or keeled outer margins; anthers less than 1·5 mm. wide 4

4 Styles closely reflexed to lateral sides of fruit, more or less persistent; stamens up to 2 mm. long, anthers pale cream to white; mature fruit usually black (brown in var. *pedunculata*), slightly broader than long, 0·8-1·3 × 0·8-1·3 mm., the mericarps with keeled outer margins ...... *hamulata*
Styles not usually closely reflexed to lateral sides of fruit; mature fruit brown; stamens usually more than 2 mm. long; anthers dark cream or yellow 5

5 Outer margins of mericarps distinctly winged; caespitose and terrestrial forms with stamens 2-3 mm. long, leaves about twice as long as broad; submerged plants never with linear leaves; all forms with leaves possessing at least three veins;

usually very fertile .... *stagnalis*
Outer margins of mericarps keeled; stamens normally longer than 3 mm., even in terrestrial forms; leaves usually at least three times as long as broad and up to 30 mm. long, and 1-veined, in submerged forms; plants rarely producing abundant fruit and usually about 15% of pollen inviable .... *platycarpa*

ROSA MICRANTHA BORRER EX SM., *R. TOMENTOSA* SM., *R. AFZELIANA* FR. AND *R. SHERARD II* DAVIES

By I. M. Vaughan

Roses possess a phenomenal ability for mutation, especially the section *caninae* with its four subsections *stylosae, eucaninae, villosae,* and *rubiginosae* but the mutations are contained within the limits of recognizable species. This tendency for mutation appears in the breeding of garden roses where the ability to produce "sports" is transmitted mainly through the female parent (in consonance with the peculiar breeding arrangements in *canina*). Mutations, both somatic and germinal, are much more frequent amongst F1 and F2 hybrids.

Wolley-Dod's 'Revision of the British Roses' in 1930-31 (Wolley-Dod 1930-31) is a dissection of the genus into a medley of groups, varieties, and forms, e.g. between *R. afzeliana* and the closely allied *R. coriifolia* Fr. he distinguishes no less than 32 varieties and forms. Wolley-Dod classified on the basis of almost each individual specimen but the question arises as to the stability and hereditability of his characters. He revised his revision of 1930-31 but it was never published. The MSS, which I have failed to trace, may be with his herbarium bequeathed to the British Museum (Natural History) which is involved in rearrangement and probably unavailable for another year. Wolley-Dod had grave doubts himself about his classification and in a letter quoted in Rayner's Supplement to Townsend's *Flora of Hampshire* (Rayner 1929) he attributed the varieties to a "series of very ancient hybrids, crossed and re-crossed an infinite number of times". "Very ancient" is an imprecise term; roses appear late and in small numbers in palaeobotanical records (Godwin, 1956) and possibly modern cytogenetics will not sustain his conclusion.

Clapham, Tutin and Warburg (1962) carried simplification to the opposite extreme but still referred to Wolley-Dod for further information: *R. afzeliana* (*R. glauca* Vill.) and *R. coriifolia* were amalgamated under the name *R. dumalis* which Wolley-Dod allotted to a member of the *dumales* group of *R. canina*. Wolley-Dod also gave specific rank to the hispid forms of *R. canina* as *R. dumetorum,* which is confusing. Further, Wolley-Dod retained the name *R. villosa* which the International Code of Botanical Nomenclature (1956) cited as an example of a *nomen confusum* and therefore illegitimate (see Article 65 (Lanjouw, 1956)).

G. Rowley's valuable paper on 'Aneuploidy in the Genus *Rosa*' (Rowley, 1960) showed that the chromosomes of roses are so small and so numerous that to track the individual chromosome through all its processes is impossible but of the normal ploidy number for *R. canina* of 35, 14 to 28 chromosomes are transmitted unpaired through the female gamete whilst the male gamete contains only 7. The number is the same for the somatic and the germinal cells and no correlation is apparent between variety of form and abnormality of chromosome count.

Rowley described an experiment involving, amongst others, seed of three wild species collected from open ground. About twenty plants were raised in each family. The progeny of *R. afzeliana* gave four separate varieties (*sensu* Wolley-Dod); that of *R. coriifolia* (differing mainly in pubescent leaflets and more protruding styles) gave two varieties, and that of *R. sherardi* four varieties not one of which was that of the parent plant (although there was an element of doubt about the identity of the parent).

There seems, therefore, to be a need for much more detailed field work to correlate form and varieties, whatever their status, with distributional problems although final clarification may come from the cytogeneticist. The distribution, even of the species, is very imperfectly known and the records in older County Floras are often highly dubious because of taxonomic confusion.

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IDENTIFICATION OF BRITISH *ELEOCHARIS*

By S. M. WALTERS

Of the seven species given in Clapham, Tutin and Warburg's Flora (Clapham, Tutin & Warburg, 1962, pp. 1061-4), *E. acicularis* and *E. parvula* present no particular difficulties in identification. Two of the other species, *E. quinqueflora* and *E. multicaulis*, are often misidentified and confused with each other and with *E. palustris* and *E. uniglumis* (the '*palustris* group'), but there is little excuse for this. The following *vegetative* features should be noted:

1. Habit

E. quinqueflora: individual tufts with few stems; vegetative spread by thin, whitish runners terminating in a 'winter bud'.

E. multicaulis: individual tufts quite large, many-stemmed; no elongated rhizome.

'*E. palustris* group': far-creeping rhizomes, bearing separate individual stems the first season, which develop into small tufts of a few stems each in later seasons.

2. Colour of basal sheaths

E. quinqueflora } pale brown or reddish-brown.
E. multicaulis }
'*E. palustris* group': reddish-purple, often very obvious.

3. Apex ('mouth') of uppermost sheath on stem

E. quinqueflora: rather oblique and obtuse.
E. multicaulis: very oblique and acute.
'*E. palustris* group': nearly transversely truncate.

The remaining three species in Clapham, Tutin & Warburg, 1962, belong to the '*palustris* group', which is a critical, variable group throughout the Northern Hemisphere. All three species have the biconvex nut developed from an ovary with 2 stigmas, and the strongly rhizomatous habit. The common species, *E. palustris,* consists of two subspecies, distinguished by minor characters (fruit and stomatal size) and by chromosome number. The common subspecies in Britain is the plant with $2n=38$. Unfortunately the nomenclature of the two subspecies is confused: I recommend the use of the names subsp. *vulgaris* S. M. Walters ($2n=38$) and subsp. *microcarpa* S. M. Walters ($2n=16$) to avoid ambiguity. I do not feel certain of field identifications of subsp. *microcarpa,* and require stomatal length measurements to check.

The second species of the group, *E. austriaca,* was only recently detected in Britain. Given ripe fruit it is extremely easy to distinguish from *E. palustris,* and is in fact more closely related to the Scandinavian *E. mamillata* than to either of the other British '*palustris* group' species. The ripe fruit of *E. austriaca* has a very narrow style-base and many fruits have 5 or 6 bristles at the base. In *E. palustris* and *uniglumis* fruits with more than 4 bristles are very rare (see Walters, 1963).

The remaining species, *E. uniglumis,* presents difficulties. The typical plant with thin stems in salt-marshes is easy to identify, especially if the spike is well-developed to show the single sterile glume encircling its base, and the characteristically 'punctate' pattern of the ripe nut. In N. and W. Britain especially, however, there are puzzling populations of plants intermediate between *E. palustris* subsp. *vulgaris* and *E. uniglumis*; some of these have been shown to have intermediate chromosome numbers, and are probably of hybrid origin. Finally, high polyploid derivatives (e.g. $2n=c.\,90$) of the ordinary *E. uniglumis* ($2n=46$) occur in mixed populations with the ordinary plant as at Wicken Fen, Cambs. Further work is needed on the *palustris* group in Britain and Europe.

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THE GENUS *VULPIA* IN BRITAIN

By A. J. WILLIS
(Department of Botany, University of Bristol)

Although formerly included under *Festuca,* the annual grasses of the genus *Vulpia* stand apart, not only in their annual habit, but also in their distinctly unequal glumes, narrow lemmas and long awns, and in having usually only a single stamen per flower. A close relationship between *Vulpia* and *Festuca* is, however, indicated by the existence of hybrids. Vulpias show appreciable resemblance to *Nardurus maritimus,* possibly native in Britain (Stace, 1961), but *Nardurus* differs in its simple slender panicles with chasmogamous flowers bearing 3 stamens, not very unequal glumes, and lemmas less than 4 mm.

Of the four British species of *Vulpia* two are rather rare plants of coastal and other sandy sites (*V. membranàcea, V. ambigua*) and two are widely distributed on walls, dry sandy or gravelly places and as weeds of cultivation (*V. bromoides, V. myuros*). Casuals in Britain are: *V. megalura,* an American species resembling *V. myuros,* but distinct in its ciliate lemmas; *V. ciliata,* a Mediterranean grass differing from *V. ambigua* by its long ciliate lemmas; and *V. australis* of temperate S. America close to *V. bromoides,* but with shorter, narrower lemmas (*Proc. bot. Soc. Br. Isl.,* **3**, 289-90, 1959).

For determination of the British species the keys by Hubbard (1954) and in Clapham, Tutin and Warburg (1962) are valuable; a variant is given below.

KEY TO BRITISH SPECIES OF VULPIA

1 Lower glume usually half (or more) of the length of the strongly-nerved upper glume .... *bromoides* (L.) Gray
Lower glume normally less than half the length of the obscurely-nerved upper glume 2

2 Upper leaf sheath strongly inflated; awns up to 25 mm.; lower glume less than 1/6 length of upper (upper 10-14 mm.) *membranacea* (L.) Dumort.
Upper leaf sheath little inflated; awns up to 15 mm.; lower glume usually at least 1/6 length of upper (upper up to 8 mm.) 3

3 Panicles nodding; upper glume usually not more than 3 times the length of the lower; lemma 5-7 mm. .... *myuros* (L.) C. C. Gmel.

Panicle erect; upper glume 3-6 times the length of the lower; lemma 4-5 mm. .... *ambigua* (Le Gall) More

HYBRIDS WITH FESTUCA RUBRA

All of the British Vulpias, except *V. ambigua,* are reported to hybridize with *Festuca rubra,* although *V. myuros* × *F. rubra* and the recently described *V. bromoides* × *F. rubra* (Melderis, 1965) appear very rare. The hybrids are perennials, with floral characters intermediate between those of the parents and with imperfect pollen. *V. ambigua* × *F. rubra* may not arise naturally because of the early flowering of *V. ambigua;* this winter annual grows rapidly in spring, producing flowers with large anthers (more than 1 mm. long) initially, and after flowering quickly dries up.

V. membranacea × *F. rubra*

Putative hybrids have been recorded in recent years from Guernsey, Kent, Sussex, N. Devon, N. Somerset, Merioneth, Anglesey and Lancashire, growing with the parents in coastal sites. A hybrid form with hairy lemmas (*F. rubra* var. *arenaria* × *V. membranacea*) is known from Dawlish Warren, S. Devon (*Proc. bot. Soc. Br. Isl.,* **2**, 243, 1957).

Observations suggest that *V. membranacea* has become much more abundant in some dune systems since the reduction in the rabbit population by myxomatosis in 1954 (there appears to be selective grazing of *V. membranacea* by rabbits) and the grass has flowered freely. Conditions for hybridization have, therefore, been favourable, and hybrids may be expected elsewhere with the two parents.

Studies by Miss M. E. Yandell and A. T. Herbert on plants from the Berrow dunes, N. Somerset, give strong evidence of a hybrid origin. In awn and lemma length, hybrids are intermediate between the parents.

	Awn Length		Lemma Length	
	Mean	Range	Mean	Range
F. rubra	1·5 mm.	0·5- 3 mm.	5·5 mm.	3 - 7·5 mm.
V. membranacea	15	12 -24	9	2·5-14
Hybrid	5·5	1 - 9·5	7	2·5-10

The Berrow hybrids set less than 1% of full seed (40% set in *V. membranacea* and about 30% in *F. rubra* from Berrow). Viability of these seeds was low, although a few hybrid seedlings have been raised which grew slowly.

Cytological studies in which levels of desoxyribosenucleic acid in the nuclei were estimated by means of Feulgen staining and photometric measurement with an integrating microdensitometer showed that the genomic DNA content of the hybrid corresponded exactly with the mean DNA level of the parents. Consequently the plants are almost certainly primary hybrids produced without 'ploidal' change.

Dr. A. Melderis (personal communication) has several hybrids in cultivation, and Dr. Hooper has found $2n=35$ in two specimens from Sussex and one from Kent, and $2n=42$ in one specimen from Kent, all specimens being completely sterile.

The hybrids may be recognized in the field by their perennnial habit and vegetative features (notably the dark-brown lower leaf sheaths) which resemble those of the *Festuca* parent, and their inflorescences which are superficially *Vulpia*-like, being one-sided and with long awns. Awn size is, however, variable; forms with rather short awns may be of complicated parentage. The plants are somewhat tufted, showing limited extension by rhizomes. In garden conditions, the hybrids grow much more slowly than *F. rubra,* having shorter rhizomes.

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EPIPACTIS

By D. P. YOUNG

KEY TO SECTION EPIPACTIS

1 Rachis subglabrous. Flowers pendulous, entirely apple-green except for labellum, often cleistogamous; self-fertilised. Perianth persistent in fruit .... *E. phyllanthes* G. E. Sm.
Rachis obviously pubescent. Flowers ± patent. Perianth purplish or green, shrivelling after fertilisation 2

2 Cross-fertilised. Flowers purplish or green 3
Self-fertilised. Flowers pale green except for pale pink labellum 5

3 Leaves small, lanceolate; largest 3-8 cm., length/breadth 3-4. Leaves and stem suffused with violet. Flowers yellowish-green, inside of hypochile whitish-violet, often speckled ...... *E. purpurata* Sm.
Leaves lanceolate to ovate, often large; largest (3-) 6-15 cm., length/breadth 1·5-3; dark green, rarely violet-suffused. Flowers dull green or purple 4

4 Ovaries noticeably pubescent; rachis with thick hoary pubescence. Internode under lowest flower much longer than others. Flowers usually red-purple; hypochile red inside; epichile with large crinkly bosses. Plants often very small ... *E. atrorubens* (Hoffm.) Schult.

Ovaries subglabrous; pubescence of rachis not thick or crisped. Internode under lowest flower scarcely longer than the next. Flowers from dusky purple to apple-green; epichile with small smooth bosses; hypochile dark brown or dark green inside. Plants often very large .... *E. helleborine* (L.) All.

5 Plant slender. Flowers small. Epichile not longer than broad. Sand-dunes ...... *E. dunensis* (T. & T. A. Steph.) Godf.
Plant robust. Flowers large. Epichile longer than broad. Calcareous woods .... *E. leptochila* (Godf.) Godf.

NOTES

Pressed specimens other than well-grown examples in early flower may be impossible to determine with certainty and should not be collected for naming. But a single unpressed fresh flower can usually be determined by an expert.

Cross-fertilisation can be ascertained: by the presence of rostella in freshly-opened flowers, which when touched with the point of a pencil will draw out the pollinia; or by the absence of pollinia by insect removal from the majority of older flowers. But in exposed situations the rostellum dries up soon after the flower opens, and self-fertilisation may ensue.

In self-fertilised species the rostellum is not visible, the pollinia cannot be removed on a pencil, but the pollinia soon crumble (often before the bud has opened) and fertilise the stigma below.

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PLANT NOTES

633/1. Corallorhiza trifida Chatel. On 25th May 1965 a peloric form of *Corallorhiza trifida* was found in long grass at the eastern end of the area known as the Buckie Loch, Culbin State Forest, Moray (v.c. 95). Associated species observed were *Iris pseudacorus, Agrostis tenuis* and *Potentilla palustris,* with *Salix aurita* c. 30 feet away. Further search to the west revealed many more abnormal specimens of varying degrees of "perfection", these were in wet open ground with *Salix repens, Potentilla anserina, Veronica scutellata, Eleocharis palustris,* etc.

A coloured transparency of the plant was sent to Mr. V. S. Summerhayes, who commented: "I do not remember seeing or hearing about this type of abnormality in *Corallorhiza* but I am not surprised, as peloria (the replacement of the outer petals by labella or vice-versa) has been recorded from many different genera of orchids. I have actually seen examples in *Ophrys insectifera* and *O. apifera,* and in *Gymnadenea conopsea,* and variants have been recorded in other British Orchids". In a later letter, Mr Summerhayes writes: "I visited Kew last week and looked up the literature on *Corallorhiza* to see if there were any references to peloriate flowers. To my great surprise I found a reference to Greville, *Flora Ediniensis,* p. 187 (1824), which reads as follows, on looking up the original.

'I possess a highly curious monstrosity of this plant from Raveling-toll [west of Edinburgh, but now extinct there]. In all the flowers of one individual the two outer [should be inner I think] of the connivent segments of the perianth are converted into lips, as large as the true lip and beautifully spotted; the 3 remaining segments appear between them as a triphyllous calyx'.

This seems to agree very well with your plant but it is the only record I could find in the standard European monograph. Evidently such peloriate forms are scarce and have so far been recorded only from Scotland!".—M. MacCallum Webster.

640/1. Ophrys apifera Huds. On 6th June 1950 a variant of *Ophrys apifera* was first noticed growing in rough grass one mile S.E. of Wendover in Buckinghamshire. Since 1950 it has persisted in varying numbers.

The three outer perianth segments were of a darker, much more vivid lilac-pink than the type; the labellum was of a uniform bright chestnut red velvet, with none of the usual patterning. The three velvet lobes of the labellum were turned back in the usual way but with unusually bright green edges.

In 1950, when the seed ripened on the variant specimen a ripe capsule was carried across a lawn and the seed scattered on a bank where it was hoped to establish the variant. The day was windy and hence it is believed, but cannot be proved, that the existence in 1953 of a number of rosettes of young Bee Orchids along the line of the passage across the lawn originated from blown seed from the ripe capsule that had been carried across it. These plants were moved early in the year into a flower bed; two flowered in 1953, one was the type and the other was a variant.

During 1954 twelve plants flowered in the original field; six typical species and six variant.

In 1955 three plants that had been transplanted from the field on to the bank all proved to be typical species.

No further observations were made until 1966. In April 1966 seventeen rosettes were seen in the original field but only eight flowered. One was eaten and of the remaining seven, two were typical species and five were variant. All set seed, but the field was mown before the capsule ripened.

The variation seems to be purely a colour variant and no difference of form from the typical species could be detected.

Most plants of another group of Bee Orchids growing at the edge of a beech wood a quarter of a mile away from the first colony showed a variation with projecting points of the central lobe of the labellum not reverted but sometimes bifurcated and very irregular. The colour was the same as in typical species.—NORA BARLOW.

681/1. MELICA UNIFLORA forma ALBIDA P. Junge. David Allen's stimulating paper in *Watsonia*, **6**, 205-215, 1966, prompts this note. On the 29th of May 1955 a large patch of the white flowered form of the Common Melic (*Melica uniflora* forma *albida*) was found in Larkey Valley Wood in East Kent. A small portion prospered in my garden at Platt, W. Kent, and seedlings have been frequent ever since. These invariably have white inflorescences. So far as I know the typical species does not grow within a mile or so of my home.—D. MCCLINTOCK.

690/1. GAUDINIA FRAGILIS (L.) Beauv. This grass was found in plenty by the States Dairy in Alderney on 5th June 1963, where it still grew in 1964. The seedling I took has persisted in the open in my garden at Platt, Kent, in a robust condition ever since, including the harsh winter of 1963/4. Not only is this plant obviously perennial, but its progeny persist similarly. Yet the 'books' say that the species is annual.

I showed specimens and discussed this with Drs. Hubbard and Melderis at the Exhibition meeting in November 1966. The latter commented that *Bromus lepidus* in his garden has already persisted for three years, and suggested this may be caused by growing, and climatic conditions as well as by a lack of competition. Certainly my *Gaudinia* has no competition. But is this all? This grass has, I believe, been seen continuously for more than one year on end elsewhere in the British Isles only in the Isle of Wight. It is, if not a chance introduction, on the edge of its range in these areas. Is this perennation perhaps an adaptation to the more extreme conditions of our climate?

Specimens will be deposited at Kew and the British Museum during 1967.—D. MCCLINTOCK.

PLANT RECORDS

Compiled by E. C. WALLACE

"Plant Records" are arranged in the order given in the *List of British Vascular Plants (L.B.V.P.)* by J. E. Dandy (1958).

Records where no date is given are for the year 1965.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.* Some of these records may, however, apppear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

7/1. HYMENOPHYLLUM TUNBRIGENSE (L.). Sm. H.39, Antrim; Craigagh Wood, Glendun, plentifully; confirmation of a record made by Brenan (1884), W. Aitken & M. Gunning (1966, *Ir. Nat. J.*, **15**, 210).

24/2. THELYPTERIS PALUSTRIS Schott. 9, Dorset; near Arne in some quantity, D. Ranwell (1966, *Proc. Dorset nat. Hist. archaeol. Soc.*, **87**, 35).

§25/a. POLYPODIUM AUSTRALE Fée. *36, Hereford; walls of Goodrich Castle, R. H. ROBERTS.

46/10. RANUNCULUS AURICOMUS L. 49, Caern.; a small patch of this species, which is almost absent from West Wales, has been found on base-rich soil overlying the Carboniferous Limestone. The record from Harlech in the *Atlas of the British Flora* is an error, R. H. ROBERTS (1965, *Nature in Wales*, **9**, 220). 52, Anglesey; a good colony discovered on a base-rich laneside and in the hedge bank of a nearby field, near Llangsed. Previously known in Anglesey only from the wood above Baron Hill, near Beaumaris (see H. Davies, *Welsh Botanology*, 1813), Miss P. Roberts, comm. R. H. Roberts (1965, *Nature in Wales*, **9**, 222).

46/22. RANUNCULUS AQUATILIS L. 98, Argyll; Black Lynn Burn, Oban, 1966, E. MACPHERSON, conf. R. W. BUTCHER (as *R. heterophyllus* Weber).

58/4. PAPAVER HYBRIDUM L. 12, N. Hants.; Nether Wallop, 1966, L. F. STEARN.

§66/4. FUMARIA BASTARDII Bor. ‡37, Worcs.; allotment gardens, Malvern Link, 1883, R. F. Towndrow (1884, *J. Bot., Lond.*, **22**, 38-41).

66/8. FUMARIA OFFICINALIS L. 48, Mer.; abundant with *F. bastardii* and *F. muralis* subsp. *boraei* in cultivated field at Bryncrag, near Towyn. The true *F. officinalis* is a rare plant in West Wales: most, if not all, previous Merioneth records of this species were actually of the common *F. bastardii* or *F. muralis* subsp. *boraei*, P. M. Benoit (1965, *Nature in Wales*, **9**, 219).

§79/3. LEPIDIUM HETEROPHYLLUM Benth. ‡29, Cambridge; Sandpit, Chippenham, M.O. Hill: first certain record for Cambridgeshire, F. H. Perring (1966, *Nature in Cambs.*, **9**, 54).

§80/1. CORONOPUS SQUAMATUS (Forsk.) Aschers. ‡48, Mer.; one plant on a heap of soil on the roadside at Cae Du, Rhoslefain, about 1960; and in quantity on the farm track nearby, 1965, P. M. Benoit. First records for the county, extending northwards an interesting coastal distribution pattern in Pembs. and Cards. (see the *Atlas of the British Flora*) (1965, *Nature in Wales*, **9**, 219).

§†81/1. CARDARIA DRABA (L.) Desv. ‡88, Mid Perth; by railway sidings, Methven station, one plant, 1963; known here since 1959, A. W. Robson (1966, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 47).

§113/7. VIOLA LACTEA Sm. 25, E. Suffolk; the record given in *Proc. bot. Soc. Br. Isl.*, **6**, 57 (1965) was an error, delete from *C.F.*, E. MILNE-REDHEAD.

§114/3. POLYGALA CALCAREA F. W. Schultz. ‡37, Worcs.; field between Bewdley and High Habberley (Jorden's Herb.), (1921 Rea, C., *Trans. Worcs. Nat. Club, Suppl.*, **7**, 12).

§122/2. ELATINE HYDROPIPER L. ‡37, Worcs.; Westwood Pool, 1919, C. Rea (1919, *J. Bot., Lond.*, **57**, 323).

§140/1. MOEHRINGIA TRINERVIA (L.) Clairv. *H.16, W. Galway; limestone wall round Clonbur Abbey by shore of Lough Mask, G. C. ARGENT & G. HALLIDAY.

§†149/3. MONTIA SIBIRICA (L.) Howell. ‡37, Worcs.; top of Bredon Hill, just before the Long Plantation, Elmley Castle, C. Rea (1932, *Trans. Worcs. Nat. Club Suppl.*, **8**, 138).

§†168/3. GERANIUM ENDRESSII Gay. *5, S. Som.; hedgerow, Holford, Quantocks, 1966 *13, W. Sussex; Heyshott Common, near Midhurst, 1966, J. T. H. KNIGHT.

§168/10. GERANIUM COLUMBINUM L. *98, Argyll; Port Ramsey, Lismore, 1966: 102, S. Ebudes; Eileachan Naoimh, 1966, P. MACPHERSON.

§†171/2. IMPATIENS CAPENSIS Meerb. ‡29, Cambridge; Old West River at Earith, P. D. Sell; first certain record for Cambridgeshire, F. H. Perring (1966, *Nature in Cambs.*, **9**, 54).

§192/13. TRIFOLIUM SUBTERRANEUM L. ‡37, Worcs.; pathside from Wyre Piddle to Lower Moor, Miss F. Willis, *teste* C. Rae (1921, *Trans. Worcs. Nat. Club*, **7**, *Suppl.*, 19).

§212/11. POTENTILLA TABERNAEMONTANI Aschers. 83, Edinb.; ten plants on rock faces on Blackford Hill, Edinburgh, R. SKERRETT, conf. J. D. GROSE. *102, S. Ebudes; Eileach an Naiomh, 1966, P. MACPHERSON.

†227/d. COTONEASTER DIELSIANUS Pritzel. 3, S. Devon; a few bushes, with *C. simonsii*, on mortared walls, Holystreet, Chagford, R. SKERRETT, conf. J. E. LOUSLEY.

§†235/9. SEDUM SEXANGULARE L. ‡37, Worcs.; naturalized at Longdon Church, W. H. Hardaker (1954, *Trans. Worcs. Nat. Club*, **10**,, 328-340).

§239/8. SAXIFRAGA TRIDACTYLITES L. *98, Argyll; walls, Tirifour Castle, Lismore, 1966, P. MACPHERSON.

247/2×1. DROSERA×OBOVATA Mert. & Koch. 48, Mer.; several fine plants in a bog near Aberdovey. Similar to *D. anglica* but with broader leaves (only about twice as long as broad, against 5 or more times as long as broad in *D. anglica*). Differs from *D. intermedia* in its larger leaves (15×8 mm.) and long flower stem arising from the centre of the rosette. Has small capsules containing infertile seed, P. M. Benoit (1965, *Nature in Wales*, **9**, 219).

§†254/6. EPILOBIUM ADENOCAULON Hausskn. *56, Notts.; Papplewick, 1966, J. G. BULL.

§†254/13. EPILOBIUM NERTERIOIDES Cunn. ‡38, Warwick; weed in Wroxall Churchyard, near Warwick, 1964, R. E. Evans (1966, *Proc. Bgham. nat. Hist. phil. Soc.*, **5**, 18).

§276/1. MYRRHIS ODORATA (L.) Scop. ‡†29, Cambridge; by roadside near Old West River at Cottenham and Wilburton, Mr. and Mrs. R. Wortley (1966, *Nature in Cambs.*, **9**, 54).

§283/1. BUPLEURUM ROTUNDIFOLIUM L. ‡†86, Stirling; garden weed, Milngavie, 1964, P. O. Wright, det. and comm. R. Mackechnie (1966, *Glasg. Nat.*, **18**, 451).

§318/2. MERCURIALIS ANNUA L. ‡†76, Renfrew; weed in slightly-heated greenhouse, Bridge of Weir, a single plant, 1964; it seems likely that the seed came in soil with Geraniums purchased from a Chichester nursery E. R. T. Conacher, det. R. Mackechnie (1966, *Glasg. Nat.*, **18**, 451).

320/6. Polygonum bistorta L. 29, Cambridge; roadside north of Balsham, J. C. Faulkner: first record since 1830, F. H. Perring (1966, *Nature in Cambs.*, **9**, 54).

328/1. Urtica urens L. 98, Argyll; Eilean nam Freumha, Guilla Dobhrain, off Isle of Seil, 1966, P. Macpherson.

§335/3. Betula nana L. ‡65, N.-W. York; blanket bog in Upper Teesdale, a small colony, T. G. Hutchinson (1966, *New Phytol.*, **65**, 351).

§†351/1. Gaultheria shallon Pursh. ‡88, Mid Perth; an old established colony by Loch Horn, not hitherto recorded, A. W. Robson (1966, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 48).

355/1. Arctous alpinus (L.) Nied. 98, Argyll; Meall a Bhviridh, Glencoe, 1966, A. G. Kenneth & P. Macpherson.

§362/1(2). Monotropa hypophega Wallr. ‡37, Worcs.; beech wood near Broadway, 1954, F. M. Day (1961, *Trans. Worcs. Nat. Club*, **11**, 151). ‡44, Carm.; seven plants growing together in deep humus under hazel on Carboniferous Limestone at Crwbin, E. Griffiths (1965, *Nature in Wales*, **9**, 217).

§368/1. Hottonia palustris L. 47, Montg.; "The statement of the discovery of *Hottonia palustris* at Llyn Du, near Meifod (1965, *Proc. bot. Soc. Br. Isl.*, **6**, 59), was unfortunately a recorder's error which has only now come to the author's attention. The record should be deleted", B. Seddon.

§†369/1. Cyclamen hederifolium Ait. *55b, Rutland; Tixover, seen for several years, but now rapidly decreasing, Miss A. Sharman, comm. V. M. Leather.

†394/1. Trachystemon orientalis (L.) G. Don. 71, Man; Crogga Glen, L. S. Garrad, comm. D. E. Allen.

§†406/p. Calystegia pulchra Brummitt & Heywood. 35, Mon.; Cwn Felin Fach, Sirhowy Valley on waste ground by chapel and colliery, 1963, Miss A. P. Conolly and D. J. Hughes, det. R. K. Brummitt: 44, Carm.; Caio, by the churchyard wall and elsewhere in the village, 1963, Miss A. P. Conolly and Miss A. Hutchinson, det. R. K. Brummitt: ‡46, Card.; by Llandewi Brefi Church, 1963, A. O. Chater, det. R. K. Brummitt: ‡47, Montg.; roadside 650 yards north-east of Cemmaes, 1963, A. O. Chater, det. R. K. Brummitt: 48, Mer.; by the bridge in Rhosygwalia, near Bala, 1962, Miss S. Thomas; roadside near cottage at Brithdir, near Dolgellau, 1962, P. M. Benoit and Mrs. D. E. M. Paish; bushy place opposite houses, Mynach Road, Barmouth, 1962, P. M. Benoit; Llandrillo, on waste ground by a cottage on the north side of the main road, 1964, R. K. Brummitt, Miss A. P. Conolly (previously recorded from near Bontnewydd Station, 1959, R. K. Brummitt) (1965, *Nature in Wales*, **9**, 223-224).

407/1. Cuscuta europaea L. 29, Cambridge; near river Ouse opposite Holywell, Mrs. A. Berens: only recent record outside the University Botanic Garden, F. H. Perring (1966, *Nature in Cambs.*, **9**, 54).

§†420/2. LINARIA PURPUREA (L.) Mill. ‡52, Anglesey; on the shoreline near an old limestone quarry at Moel-y-don, W. Elfyn Hughes (1966, *Nature in Wales*, **10**, 48).

§†425/2. MIMULUS LUTEUS L. *H.16, W. Galway; damp marsh ground in field by lake shore; extreme south-west corner of "Narrow Lake" of Lough Mask by hamlet of Drishaghaun, 1965; presumably a garden escape, but none seen in the derelict gardens of nearby houses; still present, 2 or 3 plants, 1966; G. C. ARGENT & G. HALLIDAY.

§465/4. GALEOPSIS BIFIDA Boenn. ‡50, Denb.; frequent under bracken along roadside near Dawn, J. M. Brummitt (1965, *Nature in Wales*, **9**, 222).

485/7. GALIUM STERNERI Ehrend. 49, Caern.; at base of dolerite cliff, east face of Carnedd Llywelyn, R. H. ROBERTS, conf. K. M. GOODWAY.

§491/1. LONICERA XYLOSTEUM L. ‡†88, Mid Perth; near Dalcrue Bridge, below steep bank, a very large thicket, 1964, A. W. Robson (1966, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 48).

§†507/1. DORONICUM PARDALIANCHES L. *71, Man; Grogga Glen, L. S. GARRAD, comm. D. E. ALLEN.

§515/1. GNAPHALIUM SYLVATICUM L. *47, Montg.; three or four plants growing on a track through heathy woodland near Pont Robert, 1966, Miss V. J. MACNAIR, conf. F. H. PERRING.

§517/1. ANTENNARIA DIOICA (L.) Gaertn. ‡37, Worcs.; one plant seen in heath above Sling Common, Clent Hills, 1926, W. H. Hardaker (1954, *Trans. Worcs. Nat. Club*, **10**, 328-340).

†521/5. ERIGERON MUCRONATUS DC. 49, Caern.; on limestone near Llandudno, 1966, M. A. THOMPSON, conf. G. A. MATTHEWS. 50, Denb.; several plants on limestone cliffs, Byrn Euryn, Colwyn Bay, J. M. Brummitt (1965, *Nature in Wales*, **9**, 222).

§†522/1. CONYZA CANADENSIS (L.) Cronq. ‡45, Pemb.; Pembroke Dock goods yard, 1963, Miss A. P. Connolly (1965, *Nature in Wales*, **9**, 217). ‡48, Mer.; one plant on stony waste ground on Morfa Harlech, 1957, but has not reappeared; in quantity in one spot on the railway at Tonfanau, P. M. Benoit (1965, *Nature in Wales*, **9**, 219).

§†557/3. CICERBITA MACROPHYLLA (Willd.) Wallr. ‡35, Mon.; Ashcroft Chepstow, garden weed, not planted, supposedly introduced with pig manure, 1954, J. Rees (Herb. Mus. Wales (NMW)): ‡41, Glam.; Ty Coch, on a bank, 1951, J. A. Webb (Herb. Mus. Wales (NMW)): ‡44, Carm.; waste ground near Llanelly, J. R. Gates, det. S. G. Harrison: 46, Card.; Aberystwyth, established alien, 1933 (Herb. J. H. Salter); Penprompen Inn, Drefach, west of Lampeter, on roadside verge on both sides of the bridge, presumably spread from a garden nearby, Miss A. P. Connolly: ‡50, Denb.; Caer Estyn, 5 miles north of Wrexham, 1961, Miss H. Turley (Herb. Mus. Wales (NMW)) (1965, *Nature in Wales*, **9**, 223).

558/1 (217). HIERACIUM UMBELLATUM L. 71, Man; roadsides, Jurby East, and by Dollagh Mooar, 1963; previously believed extinct in the vice-county, D. E. ALLEN & M. B. BING.

§577/5. POTAMOGETON LUCENS L. 43, Radnor; 'I have redetermined a pondweed I collected from Llanbwchllyn Lake, Radnor, 1964, which I now recognise as *Potamogeton praelongus*. The record for *P. lucens* (1965, *Proc. Bot. Soc. Br. Isl.*, **5**, 62) should therefore be deleted', B. SEDDON.

§577/8. POTAMOGETON PRAELONGUS Wulf. *43, Radnor; Llyn Hilyn (or Heilyn), c. 1938, J. A. WEBB (1938), MS. *"Notes for a Flora of Radnor"*; not there in 1964. I suspect the lake level has been lowered, B. SEDDON: Llanbwchllyn Lake, 1964, B. SEDDON (Hb. Mus. Wales (NMW)): *44, Carm.; Taliaris Pool, 1966, B. SEDDON (Hb. Mus. Wales (NMW).

§†593/1. LILIUM MARTAGON L. ‡88, Mid Perth; Inveralmond, two colonies, the largest on the haugh by the river bluff in rich alluvial soil, 1964, A. W. Robson (1966, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 49).

§†605/2. JUNCUS TENUIS Willd. *H.16, W. Galway; near Kylemore, 1962, D. A. WEBB. Roadside mid-way along Doorus peninsula, N.W. Lough Corrib, 1965, G. C. ARGENT & G. HALLIDAY.

§†607/11. ALLIUM PARADOXUM (Bieb.) G. Don. *24, Bucks.; Paines End, Drayton Beauchamp, P. E. RICHARDS, conf. J. G. DONY, comm. P. R. KNIPE. *40, Salop; lane near Benthall Hall, 1966, Mrs. L. BENBOW, comm. V. M. LEATHER.

§625/1. EPIPACTIS PALUSTRIS (L.) Crantz. ‡46, Card.; in quantity on a dune slack at Ynyslas, 1964, Mrs. P. Condry. Probably a fairly recent arrival (through natural spread in this typical Welsh habitat) as it had not been reported before in such a well botanised locality (cf. *Pyrola rotundifolia* at Newborough Warren and *Epipactis phyllanthes* at Morfa Dyffryn), P. M. Benoit (1965, *Nature in Wales*, **9**, 71).

627/1. SPIRANTHES SPIRALIS (L.) Chevall. 71, Man; The Ayres at Ballaghennie, Bride, at least a dozen spikes—rivals the Sligo locality as the northernmost in the British Isles, A. HITCHON and M. QUAYLE, conf. & comm. D. E. ALLEN.

628/2. LISTERA CORDATA (L.) R.Br. 50, Denb.; four plants in a twenty-seven year old spruce plantation at 1,150 ft., Clocaenog Forest, P. Evans. *The Atlas of the British Flora* shows no 1930-onwards records for Denbighshire (1965, *Nature in Wales*, **9**, 222).

§632/2. LIPARIS LOESELII (L.) Rich. *4, N. Devon; Braunton Burrows, 1966, A. J. WILLIS.

636/1. GYMNADENIA CONOPSEA (L.) R.Br. 112, Zetland; on peat, Crougar, Island of Foula, D. L. HAWKSWORTH, conf. E. F. WARBURG.

640/1. OPHRYS APIFERA Huds. 56, Notts.; The Grives, Kirkby-in-Ashfield, J. G. BULL.

643/3×2. DACTYLORHIZA INCARNATA (L.) Soó × MACULATA (L.) Soó. 6, N. Som.; several plants on Berrow Sand-Dunes, 1966. The putative parent, *D. incarnata* is there, remarkable for the dark red colour of its flowers, but the other parent is, of course, not there as these dunes are calcareous. I suspect that the source may well have been Shapwick Fen, some 16 miles S.S.E., where both species occur, J. T. H. KNIGHT.

§†649/2. ARUM ITALICUM Mill. ‡75, Ayr; a small clump on the bramble-covered bank of the roadside between Kilmarnock and Hurlford, 1961→, H. A. McAllister (1966, *Glasg. Nat.*, **18**, 454).

652/1a. SPARGANIUM ERECTUM L. subsp. ERECTUM. 71, Man; along the Pumb River, near Castletown, 1964, L. S. GARRAD; det. C. D. K. COOK, comm. D. E. ALLEN.

652/1c. SPARGANIUM ERECTUM L. subsp. MICROCARPUM (Neum.) Domin. 71, Man; Silverburn, near Castletown, L. S. GARRAD; ponds west of Sandygate, M. B. BING, both det. & comm. D. E. ALLEN.

§660/1 RHYNCHOSPORA ALBA (L.). Vahl. ‡47, Montg.; sparingly on boggy slope on the south bank of the Afon Glesyrch, near Esgair Geiliog, Mrs. D. E. M. Paish (1965, *Nature in Wales*, **9**, 219).

661/1. CLADIUM MARISCUS (L.) Pohl. 9, Dorset; near Arne, D. Ranwell (1966, *Proc. Dorset. nat. Hist. archaeol. Soc.*, **87**, 35).

§663/15. CAREX PSEUDOCYPERUS L. ‡48, Mer.; in some quantity among *Phragmites* on Morfa Dyffryn, A. G. Spencer (1965, *Nature in Wales*, **9**, 220).

§663/24. CAREX PALLESCENS L. *H.25, Roscommon; roadside by peat bog, two miles south-west of Termonbarry, west side of river Shannon, 1966, G. C. ARGENT & G. HALLIDAY.

663/32. CAREX HIRTA L. H.16, W. Galway; just outside the wall of Ashford Castle, Cong, 1966, G. C. ARGENT & G. HALLIDAY.

§669/3. GLYCERIA DECLINATA Bréb. ‡37, Worcs.; pond, Grimley-on-Severn, 1949, T. G. Tutin (1951, *Yb. bot. Soc. Br. Isl.*, **1951**, 40).

670/4. FESTUCA ALTISSIMA All. 77, Lanark; near the river Nethan, in two places, 1962, E. C. D. Todd (1966, *Glasg. Nat.*, **18**, 455).

§670/5. FESTUCA HETEROPHYLLA Lam. 71, Man; the record in *Proc. bot. Soc. Br. Isl.*, **5**, 143 (1964), has proved to be an error. Delete from *C.F.*, D. E. ALLEN.

§†676/14. POA PALUSTRIS L. ‡37, Worcs.; in some disused brick-pits between Worcester and Upton-on-Severn . . . close to the river Severn, J. S. Palmer and R. F. Towndrow (1911, *J. Bot., Lond.*, **49**, 302).

§683/13. BROMUS LEPIDUS Holmberg. *H.16, W. Galway; roadside near end of Doorus peninsula, N. W. Lough Corrib, 1965; not seen in this locality in 1966 but found in some quantity by track, east of road, ¾ mile south of Clonbur, G. C. Argent & G. Halliday.

684/2. Brachypodium pinnatum (L.) Beauv. 19, N. Essex; calcareous grassland, Saling aerodrome, J. R. Ironside Wood.

§†683/16. Bromus interruptus (Hack.) Druce. ‡37, Worcs.; one plant . . . by side of road across Malvern Common, R. F. Towndrow (1911, *J. Bot., Lond.*, **49**, 302).

†720/3. Setaria lutescens (Weigel) Hubbard. ‡29, Cambridge; weed in garden, Green Park, Brinkley, J. C. Faulkner (1966, *Nature in Cambs.*, **9**, 54).

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to E. B. Bangerter for his assistance.

SYSTEMATIC, ETC.

1. LYCOPODIUM. Parent, G. H., 1964, Disparition et survie des Lycopodes, *Naturalistes belg.*, **45**, 506-556. An account of the dispersal methods and survival of various species of *Lycopodium* in Belgium.—[D.H.K.]

3/2. ISOETES SETACEA Lam. Seddon, B., 1965, Occurrence of Isoetes echinospora in eutrophic lakes in Wales, *Ecology*, **46**, 747-748.

21. DRYOPTERIS. Dopp, W. & Gatzi, N., 1964, Der Bastard zwischen tetraploider und diploider Dryopteris dilatata, *Ber. schweiz. bot. Ges.*, **74**, 45-55. A hybrid between *Dryopteris assimilis* and *D. dilatata* is described and figured.—[D.H.K.]

21/7. DRYOPTERIS DILATATA (Hoffm.) A. Gray. Agostini, R., 1965, Riaccertamento di Dryopteris dilatata (Hoffm.) A. Gray in Calabria, *Archiv. Bot.*, **4**, 213-222.

21/a. DRYOPTERIS ASSIMILIS S. Walker. Roberts, R. H., 1965, Dryopteris assimilis S. Walker in Snowdonia, *Nature in Wales*, **9**, 163-164. *Dryopteris assimilis*, hitherto known with certainty in Britain only from Ben Lawers in Perthshire, has been discovered in two localities in Caernarvonshire. The variations of the plants from the two Welsh populations are discussed and illustrated, and compared with the Scottish population.—[D.H.K.]

25. POLYPODIUM. Bobrov, A. E., 1964, A comparative morphological and taxonomical study of the species of Polypodium in the flora of the U.S.S.R., *Bot. Z. SSSR*, **49**, 534-545. A revision of the Russian species of *Polypodium*.—[D.H.K.]

34/1. JUNIPERUS COMMUNIS L. Walters, S. M., 1961, Wild Juniper on the Fleam Dyke, *Nature in Cambs.*, **4**, 40-41. A history of *Juniperus communis* on the Fleam Dyke, Cambridgeshire, and an account of its present state there.—[D.H.K.]

41. DELPHINIUM. Pawlowski, B., 1963, Dispositio systematica specierum europaearum generis Delphinium L., *Fragm. Flor. Geobot.*, **9**, 429-446.

46/10. RANUNCULUS AURICOMUS L. Cedercreutz, C., 1965, Einige neue Sippen der Ranunculus auricomus—Gruppe, *Acta Soc. Fauna Flora Fenn.*, **78** (4). Pp. 1-7+10 plates. Ten new subspecies of *Ranunculus auricomus* are described from Finland.—[D.H.K.]

46/10. RANUNCULUS AURICOMUS L. Fagerström, L., 1965, Neue Sippen des Ranunculus auricomus—Komplexes aus Finnland, *Acta Soc. Fauna Flora Fenn.*, **78** (1). Pp. 1-10+5 plates. Five new subspecies of *Ranunculus auricomus* are described from Finland.—[D.H.K.]

49. AQUILEGIA. Prazmo, W., 1965, Cytogenetic studies on the genus Aquilegia, 4. Fertility relationships among the Aquilegia species, *Acta Soc. Bot. Pol.*, **34**, 667-685.

67/1. BRASSICA OLERACEA L. Helm, J., 1963, Morphologisch-taxonomische Gliederung der Kultursippen von Brassica oleracea L., *Kulturpflanze*, **11**, 92-210.

77. CAKILE. Pobedimova, E. G., 1963, A review of the genus Cakile Mill., *Bot. Z. SSSR*, **48**, 1762-1775.

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113. VIOLA. Sorsa, M., 1965, Hybridization of palustres violets in Finland, *Annls. Acad. Sci. Fenn., Ser. A4, Biol.*, **86**, 4-18. Studies on hybridisation between *Viola palustris* and *V. epipsila* Ledeb. in Finland.—[D.H.K.]

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127. DIANTHUS. Weissemann-Kollmann, F., 1965, A taxonomic study in Dianthus of Palestine and of the neighbouring countries, *Palest. J. Bot.*, **14**, 141-148.

130. PETRORHAGIA. Ball, P. W. & Heywood, V. H., 1964, A revision of the genus Petrorhagia, *Bull. Br. Mus. nat. Hist., Botany*, **3** (4), 122-127.

134/1. HOLOSTEUM UMBELLATUM L. Shinners, L. H., 1965, Holosteum umbellatum (Caryophyllaceae) in the United States: population explosion and fractionated suicide, *Sida*, **2**, 119-128. The history of *Holosteum umbellatum* in the United States is reviewed both by a study of American literature and herbarium material. The plant was originally introduced from Eurasia and in 1937 was described in one publication as 'a weed recently introduced from Europe'. Until present times the species had been regarded as of rare and local occurrence, the author shows, however, that it was collected in the United States as early as 1856, and is in fact widespread and often abundant in many places though it does not now tend to spread into new areas. The European and Near East records of *H. umbellatum* are also reviewed, and it is concluded that the species may be a native of the Near East which was introduced into Europe and North Africa in early times by the activities of man.—[D.H.K.]

160. SALICORNIA. Langlois, J., 1966, Etude comparée de l'aptitude à germer des graines de Salicornia stricta Dumort., Salicornia disarticulata Moss et Salicornia radicans Smith, *Rev. Gén. Bot.*, **73**, 25-39. Seeds of *Salicornia stricta* germinate much better than those of *S. disarticulata,* and particularly those of *S. radicans.* Germination is best in solutions weak in chlorinity. Light and a previous period in damp cold are favourable to the germination of *S. stricta* and *S. disarticulata.* The speed of the germination of these three species depends on the environmental temperature.—[Author's summary, translated by E.B.B.]

163. MALVA. Slavík, B., 1958, *Pripravná studie k monografii československých slézu* (*Diplomá práce*). Pp. 238+36 tab. Praha. 1958. A revision of the Czechoslovakian species of *Malva.*—[D.H.K.]

165/A. ABUTILON THEOPHRASTI Medic. Bolman, J., 1966, Abutilon theophrasti Med., *Natura*, **63**, 111-113. Notes on the Mediterranean adventive *Abutilon theophrasti* in the Netherlands.—[D.H.K.]

166. LINUM. Baker, H. G., 1965, Charles Darwin and the perennial flax—a controversy and its implications, *Huntia*, **2**, 141-161.

190/5. MEDICAGO POLYMORPHA L. Brook, R. D. & Andrew, W. D., 1965, X-ray induced variation in Medicago polymorpha var. vulgaris, *Aust. J.*

biol. Sci., **18**, 1119-1128.

192. Trifolium. Katznelson, J. and Morley, F. H. W., 1965, A taxonomic revision of Sect. Calycomorphum of the genus Trifolium. 1. The Geocarpic species, *Israel J. Bot.*, **14**, 112-134. Four species are recognised in this revision of the geotropic species of *Trifolium* Sect. *Calycomorphum*, viz. *Trifolium anatolicum* Katzn., *T. chlorotrichum* Boiss. & Bal., *T. subterraneum* L. and *T. israeliticum* Zoh. & Katzn.

T. subterraneum is the most widely dispersed species and is divided into three subspecies: subsp. *subterraneum*, Europe, Mediterranean region, etc.; subsp. *yannicum* Katzn. & Morley, subsp. nov., Balkans, and subsp. *brachycalycinum* Katzn. & Morley, subsp. nov., Mediterranean region, S. Europe and Caucasus.

The following key is provided to the varieties of *T. subterraneum* subsp. *subterraneum*:—

A. Peduncle ± equal in length to petiole. Branches 10-45 cm. long, petioles 5-25 cm. long, heads 4-6-flowered.
  B. Plant compact, branches 10-30 cm. long; petioles 5-10 cm. long .... var. *subterraneum*
  BB. Plant more loose, robust, branches 25-45 cm. long; petioles 12-25 cm. long .... var. *majurculum* (Adamovic) emend. Katzn. (var. *oxaloides* auct., non Bunge).
AA. Peduncles much shorter than petiole. Plant small, 4-15 cm. long, densely hirsute. Heads 2-3 (4)-flowered. Calyx tube often red-purple .... var. *brachyladum* Gib. & Belli

Full descriptions and synonymy are given of species, subspecies and varieties, and the distribution of species and subspecies is illustrated by a map. *T. subterraneum* subsp. *subteranneum* var. *majurculum* is cited from Britain as a wool-alien.—[D.H.K.]

192/3. Trifolium ochroleucon Huds. Bourne, P. J., 1964, Sulphur Clover (Trifolium ochroleucon Huds.) in Cambridgeshire, *Nature in Cambs.*, **7**, 27-31. A detailed historical and distributional study on *Trifolium ochroleucon* in Cambridgeshire.—[D.H.K.]

193/1. Anthyllis vulveraria L. Pedersen, A., 1965, Anthyllis vulneraria ssp. vulneraria var. langei og Lotus uliginosus ssp. vestitus, to økologiske racer fra de jyske klitter, *Flora Fauna Silkeborg*, **71**, 149-157. Studies on *Anthyllis vulneraria* subsp. *vulneraria* and its varieties *pseudovulneraria*, *langei* and *coccinea*, and *A. vulneraria* subsp. *maritima*, subsp. *vulgaris* and subsp. *polyphylla* in Denmark, where these plants are mainly confined to dunes. *Lotus uliginosus* var. *vestitus* Lange (var. *villosus* Lam., nom. ambig.), another plant largely confined to dunes in Denmark is elevated to **L. uliginosus** subsp. **vestitus** (Lange) Hansen, comb. nov. Maps show the distribution of the two species in the country.—[D.H.K.]

195/3. Lotus ulignosus Schkuhr. Chrtková-Zertová, A., 1966, Bemerkungen zur Taxonomie von Lotus uliginosus Schkuhr und L. pedunculatus Cav., *Folia Geobot. & Phyto-Taxon. Bohem.*, **1**, 78-87. *Lotus uliginosus* Schkuhr and *L. pedunculatus* Cav. previously thought to have been conspecific have proved to be two closely related species which differ in various morphological characters, particularly in the shape of the leaflets, and the shape of the calyx and corolla. **Lotus uliginosus** is a European species with a subatlantic areal character, and is distributed through the greater part of Europe and is found also in north-west Africa.

L. pedunculatus is a west-Mediterranean endemic species limited to eastern and southern Spain, though it is thought it may occur also in North Africa.

Lotus granadensis Zertova, sp. nov., is described; it is closely related to *L. pedunculatus* but is characterised by round leaflets and bright green foliage, it is at present known only from southern Spain and north-west Africa. All three species are illustrated by line-drawings.—[D.H.K.]

195/3. LOTUS ULIGINOSUS Schkuhr. Zimay, H., 1965, Studies on the ecology of Lotus uliginosus Schk., *Fragm. Flor. geobot.*, **11**, 393-408.

195/3. LOTUS ULIGINOSUS Schkuhr.—See 193/1. ANTHYLLIS VULNERARIA L.

207/4. LATHYRUS PRATENSIS L. Simola, L. K., 1964, On the cytology of Lathyrus pratensis, *Annls. Acad. Sci. Fenn., Ser. A4, Biol.*, **78**, 5-19. Cytological studies on material of *Lathyrus pratensis* from populations in Finland, Sweden, Germany and France.—[D.H.K.]

212. POTENTILLA. Pawlowski, B., 1965, De generis Potentilla L. Serie Crassinerviae (Th. Wolf.) B. Pawl. nec non de taxis affinibus, *Fragm. Flor. geobot.*, **11**, 53-91.

256. OENOTHERA. Gregory, D. P., 1963, Hawkmoth pollination in the genus Oenothera, *Aliso*, **5**, 357-384.

256. OENOTHERA. Rosténski, K., 1965, Some new taxa in the genus Oenothera L. subgenus Oenothera L., *Fragm. Flor. geobot.*, **11**, 393-408. Descriptions of a number of new species of *Oenothera* found in Europe.—[D.H.K.]

262. CALLITRICHE. Dersch, G., 1965, Notizen über das Vorkommen von Callitriche—Arten in (Nord) Hessen, *Hess. Flor. Briefe*, **164**, 35-42. A cyto-taxonomical revision of *Callitriche* in the northern part of the province of Hessen, southern Germany. Particular attention is given to *C. stagnalis* and *C. platycarpa*, and a table is provided showing the distinguishing characters of the two species.—[D.H.K.]

319. EUPHORBIA. Verdus, M. C., 1964, Les plantules des *Euphorbes* françaises, *Bull. Soc. Hist. nat. Toulouse*, **99**, 136-156. Studies on the seedlings of some of the species of *Euphorbia* found in France.—[D.H.K.]

320→POLYGONACEAE. Husson, P., 1965, Structure nodale de quelques Polygonacées, *Bull. Soc. Hist nat. Toulouse*, **100**, 96-100. The structure of the nodes, when cut through at mid-stem and near the apex, is examined, particularly in *Polygonum hydropiper*. The importance of this structure in the evolution and classification of angiosperms is discussed.—[E.B.B.]

325/21. RUMEX TRIANGULIVALVIS (Danser) Reching. f. Sukopp, H. & Scholz, H., 1965, Neue Untersuchungen über Rumex triangulivalvis (Danser) Rech. f. in Deutschland, *Ber. dt. bot. Ges.*, **78**, 455-465. The history, distribution and spread of the North American adventive *Rumex triangulivalvis* in Germany is reviewed and discussed.—[D.H.K.]

341/1. QUERCUS CERRIS L. Frileux, P. N., 1965, Présence du Quercus cerris L. dans une localité de la Seine-Maritime, *Revue Socs. sav. hte-Normandie*, **37**, 29-33. The author records a large population of *Quercus cerris* from Rouen. A detailed description of the locality is given as this tree, hitherto unknown in Normandy, appears to have all the signs of being spontaneous.—[E.B.B.]

371. TRIENTALIS. Kornás, A. Medwecka—, 1963, Observations on the variability of Trientalis europaea L. in Finland, Norway and Poland, *Ber. geobot. Forsch Inst. Rübel.*, **34**, 28-36.

379. VINCA. Dwyer, J. D., 1964, The taxonomy of the genera Vinca, Lochnera and Cantharanthus, *Lloydia*, **27**, 282-285.

379/1. VINCA MINOR L. Salisbury, E. J., 1965, The fruiting of the Lesser Periwinkle (Vinca minor), *Jl. R. hort. Soc.*, **90**, 217-218.

400. MYOSOTIS. Welch, D., 1961, Water Forget-me-nots in Cambridgeshire, *Nature in Cambs.*, **4**, 18-27. Water Forget-me-nots were measured in several respects and the general separation into the two species *Myosotis scorpioides* and *M. caespitosa* was shown to be reasonable. The differences between *M. scorpioides* and *M. caespitosa* were considered in detail and the method of separating them used in Clapham, Tutin and Warburg's *Flora of the British Isles* was discussed. Finally, what is claimed to be a more reliable method, depending on corolla size was put forward.—[Author's summary.] The following artificial key to the *Myosotis* species of wet and damp places, from superficially similar species of other habitats, is provided:—

1 Leaves little more than twice as long as broad, flowers very pale blue .... *M. brevifolia*
Most leaves three times as long as broad, or more; flowers blue 2

2 Corolla rarely less than 4 mm. in diameter, hairs on lower part of stem spreading, plant perennial 3
Corolla never more than 5 mm. in diameter, hairs on lower part of stem adpressed, style ½ calyx length, plant annual to biennial 4

3 Fruit pedicels not more than twice the length of the calyx, calyx teeth never more than two-fifths length of calyx, usually ⅓; cymes usually ebracteate ...... *M. scorpioides*
Fruit pedicels 2½×5 times the length of the calyx, teeth usually about ½ length of calyx; cymes bracteate .... *M. secunda*

4 Calyx pubescent, corolla lobes flat, nutlets truncate at base ...... *M. caespitosa*
Calyx almost glabrous, corolla lobes concave, nutlets rounded at base (sand-dunes, Jersey) .... *M. sicula*

307/I. IPOMOEA. Matada, E., 1964-66, El género Ipomoea en México, *An. Inst. Biol. Univ. Méx.*, **34**, 85, 145; **35**, 45-75; **36**, 83-106. A revision of the species of *Ipomoea* found in Mexico, with descriptions, Keys to the identification of species, synonymy, geographical range, etc. Many of the species are illustrated by photographs or line drawings.—[D.H.K.]

420. LINARIA. Jankó, B., 1964, Variation-pattern investigations in natural Linaria populations, 1. Pollen examinations, *Acta bot. hung.*, **10**, 257-274.

429. DIGITALIS. Werner, K., 1964, Die Verbreitung der Digitalis-Arten, *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg Jg. 13, mathem.-naturw. Reihe,* H.**6**, 453-486.

429/1. DIGITALIS PURPUREA L. Cyunei, E., 1965, Wysstepowanie Digitalis purpurea L. w Polsce, *Fragm. Flor. geobot.*, **11**, 358-362. In Poland and adjacent territories *Digitalis purpurea* is not native but occurs as an escape from cultivation. It is now widely naturalised in woodlands, etc., and is spreading.—[D.H.K.]

430. VERONICA. Tacik, H. Trzeińska, 1964, Rozmiezezenie Veronica agrestis L., V. opaca Fr. i V. polita Fr. w Polsce i na terenach sasiednich,

Fragm. Flor. geobot., **10**, 61-79. Examination of herbarium material of Polish species of *Veronica* has revealed considerable confusion between the identification of *V. agrestis*, *V. opaca* and *V. polita*. The authors have revised this material and have carried out studies on the distribution of the three species in Poland.

V. agrestis is rather common in fields of cereals and root-crops all over the Polish lowland, especially in the alliance *Polygono-chenopodium polyspermii* Br. Bl. ex Tx. It also prefers locally cooler and wetter environments than the other two species. *V. opaca* is less widespread but is found in scattered lowland habitats similar to those of *V. agrestis*. *V. polita* is common in the southern part of the Polish lowland.—[D.H.K.]

440. OROBANCHE. Cezard, R., 1965, Orobanchacées: 1. Culture experimentale, *Bull. Acad. Soc. Lorraine Sci.*, **5**, 279-285. A description is provided of a simple and efficient method for germinating and growing *Orobanches* on the roots of their host plants. Positive results were obtained in nine out of the twelve species studied.—[E.B.B.]

448. THYMUS. Jalas, J. & Pohjo, T., 1965, Chromosome studies in Thymus L. (Labiatae), 2. Some Swiss and Hungarian taxa, *Annls. Bot. Fenn.*, **2**, 165-168: 3. A few counts on miscellaneous taxa, *loc. cit.* **2**, 169-170.

465. GALEOPSIS. Slavíková, Z., 1963, Bemerkungen zur Taxonomie der Gattung Galeopsis L., *Nov. Bot. Hort. Bot. Univ. Prag.*, **1963**, 39-43.

472/1. PLANTAGO MAJOR L. Salisbury, E. J., 1965, Germination experiments with seeds of a segregate of Plantago major and their bearing on germination studies, *Ann. Bot.*, **29**, 513-521. Experiments are reported on the germination of over 6,000 seeds of a large strain of *Plantago major*. The freshly ripened seeds are shown to exhibit varying degrees of natural dormancy that is gradually lost in contact with the soil and more quickly in air. Germination is naturally intermittent, the germination flushes being associated with the more-marked fluctuations of temperature. Seeds stored for five months germinated in quasi-simultaneous manner. The results emphasize the importance of sowing freshly ripened seed from individual plants when assessing biological behaviour.—[Author's summary.]

501→COMPOSITAE. Meyer, H., 1964, Development of the pappus in ligulate Compositae, *Nature in Cambs.*, **7**, 31-33.

502. BIDENS. Debray, M. & Jallu, J., 1965, Les espèces étrangères du genre Bidens dans le sud-ouest de la France, *Bull. Cent. Étud. Rech. Scient., Biarritz*, **5**, 309-315. An account of the spread in south-west France of four adventive species of *Bidens* of American origin, viz. *B. comosa*, *B. frondosa*, *B. aurea* and *B. bipinnata*. The methods of introduction and the means and degree of the naturalisation of the four species is investigated.—[E.B.B.]

505/2. XANTHIUM SPINOSUM L. Widder, F. J., 1964, Die Veranderlichkeit von Xanthium spinosum, *Phyton*, **11**, 31-33. A revision of the varieties and forms of *Xanthium spinosum*, including the descriptions of a number of new taxa.—[D.H.K.]

514. FILAGO. Wagenitz, G., 1965, Zur Systematik und Nomenklatur einiger Arten von Filago L. emend Gaertn. subgen. Filago ("Filago

germanica" Grappe), *Willdenowia*, **4**, 37-59. Studies on *Filago* subgenus *Filago*.

538. ARCTIUM. de Langhe, J. E., 1965, Les Bardones (Genre Arctium) de Belgique et des régions voisines, *Naturalistes belg.*, **47**, 21-30. A revision of *Arctium* in Belgium, with descriptions, keys, ecological and habitat data. Distribution maps of the various species are also provided. —[D.H.K.]

558. HIERACIUM. Fagerström, L., 1965, Vier neue Hieracium-Arten aus Ostfennoskandien, *Acta Soc. Fauna Flora Fenn.*, **78** (2). Pp. 1-10+4 plates.

560. TARAXACUM. Richards, A. J., 1965, Some problems in Taraxacum, *J. Durham Univ. Nat. Hist. Soc.*, **11**. Pp. 7. A short review of apomixis, taxonomy, distribution and nomenclature in *Taraxacum*. Four sections of the genus are known in Britain, these are tabulated as follows:—

SECTION	CHROMOSOME NUMBER(S)	HABITATS	DIAGNOSTIC CHARACTERS
Vulgaria	24	Waste land, disturbed ground	Large size, narrow reflected bracts, uncorniculate
Erythrosperma	24, 32	Xerophytic. Walls, heaths, dunes, etc.	Red fruits, corniculate bracts
Palustris	32	Alkaline fens, water meadows, etc.	Wide margined adpressed ovate bracts, entire leaves
Spectabilia	24, 32, 40, 48	Acid mires	Narrow margined adpressed narrower bracts, serrate leaves

Two other lowland sections which occur in Europe, the *Obliqua* and the *Boreigana*, may well prove to be British. The former are local plants in dune slacks in the low countries and may be found in similar habitats on the east coast of Britain. The latter occur in boreal pine forests in Scandinavia and may be discovered in the primeval forests of the eastern Highlands of Scotland.

The other European sections are all Arctic-Alpine, and it is likely that representatives of at least one of these sections might occur in the Scottish mountains.—[D.H.K.]

563. ALISMA. Pogan, E., 1965, Badania embriologiczne nad triploidalnym nieszáncem Alisma, *Acta, biol. cracov.*, **8**, 11-19. Studies on a natural triploid hybrid of *Alisma* ($2n=20$) resulting from a spontaneous cross between *A. lanceolatum* With. ($2n=26$) and *A. plantago-aquatica* ($2n=14$) in Poland.—[D.H.K.]

577/16. POTAMOGETON TRICHOIDES Cham. & Schlect. El Hadidi, M. Nabil, 1965, Potamogeton trichoides Cham. & Schlecht. in Egypt, *Candollea*, **20**, 159-165. *Potamogeton trichoides* was discovered in irrigation canals at Assiat, Egypt, on the west bank of the Nile, *c.* 375 km. south of Cairo in 1962. It was new to the country, and has since been found in other localities. The European and African distribution of the species is reviewed, and illustrated by a map.—[D.H.K.]

605. JUNCUS. Krisa, B., 1963, Taxonomische Stellung der Art Juncus alpinus Vill. s.l. in der europäischen flora, *Nov. Bot. Hort. Bot. Univ. Prag.*, **1963**, 28-38.

606. LUZULA. Ebinger, J. E., 1964, Taxonomy of the subgenus Pterodes of genus Luzula, *Mem. New York Bot. Gard.*, **10**, 279-305.

607/1. ALLIUM AMPELOPRASUM L. Galil, J., 1965, Vegetative dispersal of Allium ampeloprasum L., 1. Vegetative reproduction, *Israel J. Bot.*, **14**, 135-40. In Israel, two distinct forms of *Allium ampeloprasum* are found, generally growing on different soils. In one form numerous small bulblets are produced annually in the axils of the foliage leaves, while the other form is characterized by long stolons of axial-foliar origin bearing bulblets at their ends. The rate of vegetative reproduction in both forms and the length of the stolons in the mobile ones are affected by planting depth. In horizontally planted bulbs the stolons grow in all directions, some of them upwards, forming the bulblets on the surface.

Plants grown from seed were true to type, under a variety of environmental conditions.—[Author's summary.]

618. CROCUS. Walkinger, F., Namen und Verbreitung der Crocus-Sippen des Alpenost saumes, *Jahrb. d. Ver. z. Schutze d. Alpenfl. u-Tiere*, **29**, 35-52.

623. CYPRIPEDIUM. Savina, I., 1964, Fertilization in Cypripedium calceolus, *Bot. Z. SSSR*, **49**, 1317-1323.

649/1. ARUM MACULATUM L. Van den Bergen, c., 1962, Le Gouet (Arum maculatum), *Naturalistes belge*, **43**, 289-299. A detailed biological account of *Arum maculatum*.—[D.H.K.]

649/2. ARUM ITALICUM Mill. Prime, C. T. & Buckle, O., 1965, Arum italicum sous-espèces italicum et neglectum en Bretagne, *Bull. Soc. Scient. Bretagne*, **39**, 53-62. A detailed study of the distribution and ecology of *Arum italicum* and its subsp. *neglectum* in Brittany (except Loire-Atlantique). Comparison is made with populations in the south of England. They are plants of rich ground, seeking the neighbourhood of mans' habitations. The origin of the present distribution is discussed but no certain conclusion reached.—[Authors' summary, translated by E.B.B.]

663. CAREX. Hirvelä, U., 1964, Notes on the taxonomy and leaf anatomy of Carex elata All., C. omskiana Meinsh. and C. × turfosa Fr., *Annls. Bot. Fenn.*, **1**, 47-54.

664→ GRAMINEAE. Singh, D. & Godward, M. B. E., 1963, Cytological studies in the Gramineae, 2, *Heredity*, **18**, 538-540. The following chromosome numbers are given from material grown from seed supplied by the Royal Botanic Gardens, Kew:—*Catapodium rigidum*, $2n=14$; *Vulpia megalura*, $2n=63$; *Koeleria phleoides*, $2n=28$; *Agropyron caninum*, $2n=28$.—[D.H.K.]

672. VULPIA. Paunero, E., 1964, Notas sobre gramíneas, 2. Consideraciones acerca de las especies Españolas del género Vulpia Gmel., *An. Inst. Bot. A. J. Cavanilles Madrid*, **22**, 81-114.

676. POA. Jirásek, V., 1964, Einige taxonomische Probleme im Komplex der Poa pratensis L., s.l., *Acta Hort. Bot. Prag.*, **1963**, 60-68.

678. DACTYLIS. Sinskaya, E. N., 1964, Speciation and the origin of forms in the genus Dactylis, *Bot. Z. SSSR*, **49**, 177-184.

683/16. Bromus interruptus (Hack.) Druce. Perring, F. H., 1962, Bromus interruptus (Hack.) Druce a botanical dodo?, *Nature in Cambs.*, **5**, 28-30. A history of *Bromus interruptus* in Britain with a review of all the known records, and with particular emphasis on recent finds. The grass has shown a rapid decline since 1930, and only six records have been traced in the last twenty-five years. It was last recorded from Britain in Cambridgeshire in 1953, and may now be extinct.—[D.H.K.]: *Bromus interruptus* was rediscovered in Cambridgeshire in 1962 (1963, *Nature in Cambs.*, **6**, 45), and this may well be the only British vice-county in which the species is extant.—[D.H.K.]

689. Koeleria. Ujhelyi, J. 1964-65, Data to the systematics of the Sectio Bulbosae of the genus Koeleria, 4, *Annls. hist.-nat. Mus. natn. hung.*, **56**, 195-214: Data to the Sectio Bulbosae and Sectio Caespitosae of the genus *Koeleria*, **5**, *loc. cit.*, **57**, 179-202.

714. Parapholis. Paunero, E., 1964, Notas sobre gramíneas, 3. Consideraciones acerca de las especies españolas del género Parapholis, *An. Inst. Bot. A. J. Cavanilles Madrid*, **22**, 187-201.

TOPOGRAPHICAL

29, Cambridge. Bourne, P. J., 1964, Sulphur clover (Trifolium ochroleucon Huds.) in Cambridgeshire, *Nature in Cambs.*, **7**, 27-31.

29, Cambridge. Crompton, Mrs. G., 1962-65, Thriplow Meadows grazing experiment, *Nature in Cambs.*, **5**, 20, 26, **6**, 21-33, **7**, 13-15 and **8**, 16-18. Ecological and experimental studies on a meodaw at Thriplow containing a rich marsh/fen flora, including *Dactylorhiza praetermissa, D. incarnata, Blysmus compressus* and *Anagallis tenella*.—[D.H.K.]

29, Cambridge. Faulkner, J. C., 1963, Hildersham Wood: a botanical survey, *Nature in Cambs.*, **6**, 26-31.

29, Cambridge. Fordham, W. H., 1965, Modern Grange Plantation, *Nature in Cambs.*, **8**, 38-43. An ecological account of a wood near Ashwell. —[D.H.K.]

29, Cambridge. Perring, F. H., 1962, Bromus interruptus (Hack.) Druce a botanical dodo?, *Nature in Cambs.*, **5**, 28-30.

29, Cambridge. Perring, F. H., 1962 & 1964-65, Vascular plant records for 1960 and 1961, *Nature in Cambs*, **5**, 37: for 1963, *loc. cit.*, **7**, 38-39: for 1964, *loc. cit.*, **8**, 60.

29, Cambridge. Perring, F. H. & Sell, P. D., 1963, Vascular plant records for 1962, *Nature in Cambs.*, **6**, 45.

29, Cambridge. Pigott, C. D. & Martin, M. H., 1964, Hayley Wood, *Nature in Cambs.*, **7**, 23-26.

29, Cambridge. Walters, S. M., 1961, Wild juniper on the Fleam Dyke, *Nature in Cambs.*, **4**, 40-41.

29, Cambridge. Welch, D., 1961, Water Forget-me-nots in Cambridgeshire, *Nature in Cambs.*, **4**, 18-27.

38, Warwick. Cooke, R. E., 1964, Ufton Fields, *Proc. Coventry Distr. nat. Hist. scient. Soc.*, **3**, 200-201. Notes on the preliminary survey of Ufton Fields, an old clay pit area of 38 acres lying south of Ufton village. A few plant species are mentioned.—[D.H.K.]

39, Stafford. Edees, E. S., 1965, Sectional Reports: Botany, *Rep. Trans. N. Staffs. Fld. Club.*, **5**, 130-131.

42, Brecon; 43, Radnor; 44, Carm., 45, Pembroke; 46, Cardigan; 47, Montg.; 48. Mer.; 49, Caern.; 50, Denbigh; and 52, Anglesey. Benoit, P. M., 1965, Field Notes: Plants, *Nature in Wales*, **9**, 216-224.

52, Anglesey. Jones, P. Hope, 1965, Notes on some recent changes in the vegetation at Newborough Warren, Anglesey, *Nature in Wales*, **9**, 165-169.

65, N.-W. York; 66, Durham; 67-68, Northumberland; & 80, Roxburgh. Heslop-Harrison, J. W., 1965, Records: Flowering plants and ferns, *Vasculum*, **50**, 15-16 & 24.

81, Berwick. Long, A. G., 1961-63, Botany, *Hist. Berwicksh. Nat. Club*, **35**, 184-186, 323-324 & **36**, 100. Give details of the more interesting records made in Berwickshire between 1960 and 1962.—[D.H.K.]

81, Berwick. Long, D. G. and Long, A. G., 1965, Botany observations during 1964, *Hist. Berwicksh. Nat. Club*, **36**, 314.

Ireland. Eager, A. R., 1964, *A Guide to Irish Bibliographical Material being a Bibliography of Irish Bibliographies and some Sources of Information.* Pp. xiii + 392. Library Association. London. Price 96/-. Botany. Pp. 124-130. Gives details of regional floras, Botanic Gardens, biographical data on botanists, etc.

PHYTOSOCIOLOGICAL

Beeftink, W. G. De Zoutvegetatie van Zw-Nederland beschound in Europees Verband, *Meded. LandbHoggesch. Wageningen*, **65** (1). Pp. 167. Studies on salt marsh communities in south-west Holland in relation to the general halophytic vegetation of Europe.—[D.H.K.]

Bertrand, G. & Dupias, G., 1965, Contribution à l'étude phytogéographique des régions cantabriques: les vallées de Liébana, *Bull. Soc. Hist. nat. Toulouse*, **100**, 7-19. A phytogeographic study of evergreen and deciduous oak, beech, alpine and cultivated areas. Floristic lists are provided.—[E.B.B.]

Bigot, C., 1965, Aperçu géologique et floristique de la forêt de Baynes (S.-&-O.), *Rev. Fed. Franc. Soc. Sci. Nat.*, **4**, 93-103. An account of the geology of the area is given with some short notes on the related phanerogamic flora.—[E.B.B.]

Bournerias, M., 1965, Quleques aspects de l'influence de l'Homme sur la végétation du Bassin Parisien: Destruction et protection des landes torbeuses et tourbières, *Revue. Socs. sav. hte. Normandie*, **37**, 7-13. The intervention of man in boggy heaths and peat-bogs is not all destructive of the rich vegetation of these habitats on the way to disappearance. The presence of ditches, extraction of peat and above all ploughing can play an important part in the protection of the rarest and most menaced species. [Author's summary, translated by E.B.B.]

Corillion, R., 1965, Sur quelques limites phytogéographiques dans le Nord-Ouest de la France (Genres Quercus (Tourn.) L. et Carpinus (Tourn.) L., *Revue. Socs. sav. hte-Normandie*, **37**, 15-27. The present range in north-west France, is precisely given for four species: *Quercus ilex* L., *Q. lanuginosa* Lamarck, *Q. toza* Bosc. and *Carpinus betulus* L. According to recent observations made during the setting up of the Vegetation Map of France on a 1/200,000 scale.—[Author's summary, translated by E.B.B.]

DONITA, N., 1965, Vegetationsstafen in der Karpaten Rumäniens, *Rev. Roum. Biol., Sér. Bot.*, **10**, 455-467.

GEORGESCU, G. C. & DONITA, N., 1965, La division floristique des Carpates de Roumanie, 1, *Rev. Roum. Biol., Sér. Bot.*, **10**, 357-369.

HEGG, O., 1965, Untersuchungen zur Pflanzensoziologie und ökologie im Naturschatzgebiet Hohgant (Berner Voralpen), *Beitr. geobot. Landesaufn. Schweiz*, **46**. Pp. 188.

ROSE, F., 1965, Comparison phytogéografique entre les pelouses crayeuses du Mese-xerobromien des vallées de la Basse-Seine, de la Somme, de l'Authie, de la Canche, de la Cuesta Boulennaise du Pas-de-Calais, et du Sud-Est de l'Angleterre, *Revue. Socs. sav hte.-Normandie*, **37**, 105-109. The "xerophilous" floras of the chalk meadows and of several areas in the north of France are compared, and the author notes that: 1. The Pas-de-Calais is to-day very poor in xerophilous species; 2. the valley of the Somme above Amiens has a flora which forms a veritable island of the calciphile flora of Central Europe and thus resembles that of the Basse-Seine.—[Author's summary, translated by E.B.B.]

VAN DEN BERGHEN, C., 1965, Notes sur la végétation du Sud-ouest de la France, 2 and 3, *Bull. Jard. bot. État. Brux.*, **35**, 355-368. A study, illustrated by tables, of associations on fixed dunes. These are *Roseto-Ephedretum* and *Euphorbieto-Ammophiletum arenariae*. Part 3 consists of an account, illustrated by tables, of associations mainly of halophytic species (*Halimione portulacoides, Suaeda fruticosa*, etc.) on saline meadows.—[E.B.B.]

HISTORICAL

COATS, A. M., 1965, Notes on some portraits of British botanists and gardeners, *Huntia*, **2**, 185-214.

COLLANDER, R., 1965, *The history of botany in Finland*, 1828-1918. Pp. 159. Societatis Scientaram Fennica. Helsinki. A detailed account of the history of the study of Finnish botany, with an appendix on forest science by Y. Ilvessale. A comprehensive bibliography is given.—[D.H.K.]

ECKARDT, T., 1965, Zum Gedenken an den 200 Geburtstag von Carl Ludwig Willdenow *22.8.1765 †10.7.1812, *Willdenowia*, **4**, 1-21. A biographical account of C. L. Willdenow to celebrate the bicentenary of his birth. A chronological list of his publications is appended.—[D.H.K.]

ROBYNS, W., 1965, Les microfiches d'herbier au Jardin Botanique de l'Etat, *Bull. Soc. r. Bot. Belg.*, **99**, 9-12. A list is given of the important herbaria of which microfiche copies are held by the State Botanic Garden at Brussels. These include Linnaeus, A. P. de Candolle, C. P. Thunberg, J. Burser, Mus. Bot. Hauniense, M. Vahl, P. Forskål, J. C. Koenig and P. E. Isert & P. Thonning.—[E.B.B.]

STEARN, W. T., 1965, The five brethren of the rose: an old botanical riddle, *Huntia*, **2**, 180-184. Notes on the origin of an old botanical riddle relating to the five sepals of *Rosa canina* and other dog-roses.—[E.B.B.]

PALAEOBOTANY

JALUT, G., 1965, Analyse pollinique d'une tourbiere de la forêt de Rambouillet, *C. R. Som. Soc. Biogeographie*, **42**, 58-62. The analysis of results from pollen collected from a bog at Poigny, south of Paris, shows a flora comparable with that of bogs in the south of England and Normandy.—[E.B.B.]

Sorsa, P., 1965, Pollenanalytische Untersuchurgen zur spätquartären Vegetations-und Klimaentwicklung im östlichen Nordfinnland, *Annls. Bot. Fenn.*, 2, *Sonderdruck*, **30**, 1-413.

MISCELLANEOUS

Bouby, H., 1965, Contribution à l'inventaire floristique du sud-ouest (Landes et Basses-Pyrénées), *Bull. Cent. Étud. Rech. Scient., Biarritz*, **5**, 301-307. A list of the more interesting plants of south-west France is given by localities.—[E.B.B.]

Dupontreue, G., 1965, Flore de la Somme. Troisième Supplément, *Rev. Fed. Franc. Soc. Sci. Nat.* In this third supplement to the Flora of the Somme, an account of the grasses is continued, *Festuca, Bromus* and *Agropyron* being included.—[E.B.B.]

Leonard, J., 1965, De l'importance du dépôt et de la citation de spécimens d'herbier de référence dans les travaux scientifiques basés sur du matériel végétal, *Bull. Soc. r. Bot. Belg.*, **99**, 5-7. All research workers are urged to deposit voucher specimens in accessible herbaria of plants used in their investigations, and in their publications the herbaria where these specimens are preserved should be cited. Editors of journals should try to ensure that this is done (resolution 8, Xth International Botanical Congress, Edinburgh, Aug. 1964).—[Author's summary.]

Rogers, J. L., *et al.*, 1965, Documented Plant chromosome numbers 65:1, *Sida*, **2**, 163-170. The following chromosome numbers have been obtained from counts on N. American material:—*Pastinaca sativa*, $n=11$; *Drosera intermedia*, $n=20$ (the first report of a tetraploid plant for this species); *Impatiens capensis*, $n=10$; *Phytolacca americana*, $n=18$; *Cakile maritima*, $n=9$; *Cardamine hirsuta*, $n=8$.—[D.H.K.]

Stearn, W. T., 1965, The origin and later development of cultivated plants, *Jl. r. hort. Soc.*, **90**, 279-291 & 322-340. The Masters Memorial Lecture, given before the fellows of the Royal Horticultural Society on 1st September, 1964.—[D.H.K.]

Villion, P., 1965, Flore adventice d'un chintier de construction à Bayeux (Calvados), *Cah. Nat.*, **21**, 99-103. During the construction of new buildings at Bayeux the former garden of the Town Hall was used as a builder's yard. The plants colonising the area during a period of 27 months are listed, and the list analysed. A preponderance of therophytes and hemicryptophytes is noted; also that 25% are Composites and 20% grasses.—[D.H.K.]

LOCAL FLORA WRITER'S CONFERENCE, BRISTOL, 1966

A Conference for Local Flora Writers was held at the Department of Botany and Wills Hall, University of Bristol, by kind permission of Professor E. W. Yemm and Mr J. F. Sloane, on September 17th and 18th, 1966.

The Conference was attended by 70 members, mainly those at present working on a Local Flora, but also by some Officers and Committee members of the Society and County Recorders.

On Friday evening, September 16th, Conference Members were welcomed by Dr Frost at Wills Hall, and a number of Local Floras and books on critical species were on display. On Saturday, September 17th, 14 papers were read in the Department of Botany under the Chairmanship of Professor E. W. Yemm, Dr A. J. Willis and Dr L. C. Frost. Keys and notes on these papers, assembled by Dr Willis, have been published separately in these *Proceedings* (see p. 362). At the Conference the keys were supplemented by specimens, colour slides and exhibits, and the Papers were followed by a short discussion. In the evening, a number of exhibits relating to Local Floras were presented by Conference members.

A Field Excursion on Sunday morning, September 18th, was held in the Avon Gorge. Current field experiments by members of the Botany Department in Walcombe Slade and botanical specialities of the Gorge including the *Sorbus* spp. were demonstrated by Dr Willis, Dr and Mrs Harley, Dr Frost, Dr Martin, Mr Nethercott, Mr Spray and Mr Staples. An interesting record, *Polypodium australe*, was made by Mrs Briggs and Mrs Russell.

In the afternoon, the Chairman, Dr F. H. Perring, led a discussion on the ways in which the Society's records are published and kept. He outlined the history of the new Records Committee which incorporates the functions of the Local Floras Committee and the Maps Committee, and takes over from the Development and Rules Committee responsibility for maintaining lists of County Recorders and a panel of Experts.

The discussion fell into two parts. The majority of the time was spent in discussing criteria for the publication of records, and the procedure which it would be most satisfactory to develop to ensure the accuracy of the records published: a short time was also spent in considering how the Society could best help recorders in maintaining adequate county records.

A number of conclusions were reached:—

1. That the possibility of publishing a Census Catalogue of British Vascular Plants comparable with the Census Catalogues of British Mosses and Liverworts be investigated, combining the work of Messrs Kent and Wallace, and the records made during the Distribution Maps Scheme.
2. That records submitted for publication in the *Proceedings* of the Society should be seen by the County Recorder, who would pass them on, with appropriate comment, to the person responsible for editing Plant Records.

3. That the following criteria might be used as a guide to the kinds of record which should be submitted for publication:—
   (a) New County Records.
   (b) Second County Records.
   (c) Rediscoveries of any species not recorded in a vice-county for fifty years or more.
   (d) New County Records for any taxon below the level of a species.
   (e) Any other record which significantly increases the known distribution of a species.
4. That it would be impossible to produce a list of critical groups which could not be accepted unless material were determined by an expert: the ability of members and Recorders was too variable.
5. That if the Society would provide record cards and card index drawers a number of Recorders for counties where no system of record keeping was yet in operation would be willing to start the setting up of card indices, at least for the rarer species which occur in their counties. The idea that as far as possible these indices should be handed on from Recorder to Recorder was generally accepted.
6. There was a long discussion on whether or not a request should be made that a voucher specimen should accompany every record submitted for publication. There was a difference of opinion between those who felt, on conservation grounds, that it would be dangerous for the image of the Society if the collection of specimens of local rarities, as *N.C.R.'s* must usually be, were encouraged, and those who felt that without adequate safeguards the reliability of the records would be reduced, and the possibility of re-identification of critical material in the light of new taxonomic advances, possibly lost. It was agreed that the Records Committee might prepare a statement for the guidance of Recorders which would ensure scientific accuracy without jeopardising the interests of conservation.

Later Dr Harley led a visit to the spicate mints growing in the University Botanic Garden, and this was followed by a lecture by Dr Frost on "Rare Plants and the Flora of the Lizard Peninsula," illustrated by colour slides and sound recordings. We should like to acknowledge our gratitude to Dr Frost and his colleagues in the Department of Botany for the organisation of local arrangements which ensured a very successful and enjoyable conference.—M. BRIGGS.

REPORT OF THE WELSH REGION AUTUMN MEETING, 1966

A most successful Autumn Meeting was held at Aberystwyth on the 24th and 25th September 1966. Attendances at the morning, afternoon and evening sessions of the 24th were 33, 39, and 25 respectively. The theme of the morning session was on nature reserves. The guest lecturer, P. Walters Davies, of the Nature Conservancy, Aberystwyth, outlined the procedures for the selection of nature reserves in Wales. He then went on to deal with the problems of management, showing how the composition of a reserve could rapidly change and in so doing destroy the value of the reserve for its original purposes. Examples of problem areas, where marked changes were taking place, included Oxwich, where the fresh-water area was being rapidly invaded by *Phragmites communis* and other 'reed' species; some of the South Wales sand-dunes where *Hippophae rhamnoides* was forming thickets at an alarming rate; and the Rheidol oakwoods where the natural oak was not regenerating itself, but was being replaced by other species. David Davis talked about the problems of management in a school nature reserve near Rhandirmwyn. This was a high altitude oak wood which provided the pupils of the local primary school with wonderful opportunities of observing nature at first hand. He ended his lecture with a tape recording of the school children describing a series of slides which illustrated the various aspects of observation and work in the reserve.

The first lecture of the afternoon session, on the past history of the Welsh flora, was given by Dr. Peter Moore. He showed that by means of pollen analysis, carried out on peat samples in Cardiganshire, it was possible to trace changes that had occurred in the composition of the flora since about 10,000 B.C. These changes reflected changes in the climate, the soil, and, since about 3,000 B.C., of changes brought about by man. Human influence was clearly shown by the presence of species of weed such as the plantain and polygonums. Dr. Brian Seddon, of the University of Reading, then showed how changes in the distribution of aquatic species since about 1750 A.D. could be related to alterations in the lakes in which they occurred. Certain species were particularly sensitive to changes in the chemical nature of the water as a result of agricultural activities, and the natural silting-up of lakes.

Exhibits shown following the afternoon session of lectures included ones of the flora of Lleyn and the distribution of *Lamium album* by Miss A. Conolly of Leicester; of the distribution of species of *Polypodium* in Pembrokeshire by T. A. W. Davis; a large number of photographs by Mr. and Mrs. D. Parish; several species of *Rosa* by Mrs. I. M. Vaughan; and exhibits on the preparation of a county flora, progress on the "00" Survey, and the proposed "Flora of Central Wales" by Dr. J. P. Savidge.

The evening session began with the adjudication of the entries submitted for the photographic competition. In all, 36 colour transparencies, showing close-up photographs of plants, had been entered. The first prize was awarded to a picture taken by Dr. J. P. Savidge of *Orobanche minor* growing on *Eryngium maritimum* at Jersey Marine. Dr. W. W. Mapleson received second prize for a very fine photograph of *Cochlearia officinalis*, and a picture of *Paris quadrifolia* by Mrs. W. Weston was placed third. Mr. and Mrs. D. Parish then showed some superb colour transparencies of the more interesting plants of Teesdale. They then went on to give an illustrated lecture of the flora of Newborough Warren and Llanddwyn Island.

Various sites in the Aberystwyth area were visited on the 25th when the weather conditions were perfect for an excursion. There was a good attendance of 25 members, together with numerous prospective juvenile members. The first stop was to examine a large and old hybrid population of *Silene vulgaris* × *S. maritima* at Cwm Erfyn growing on lead mine tips and along a river at 600 ft. above sea-level. The next stop was to see three species of *Lycopodium* all growing together in a 2 ×2 m. quadrat at about 1,000 ft. near Ystumtuen. This also provided an opportunity to explain the procedures and purpose of the new habitat survey which was being carried out in connection with the "Flora of Central Wales".

A search led to the finding of another plant of *Cryptogramma crispa*, bringing the total population to two, in a newly discovered locality, for this species which is rare in Central Wales.

After lunch the party visited part of the Coed Rheidol Nature Reserve to see a number of the management problems described by P. Walters Davies on the previous day. The complete die-back of a large area of *Calluna vulgaris* was particularly noticeable. The last call was to see some of the very curious mixture of plants that grow on the shingle flats 18 miles upstream, along the R. Ysywyth below Pontrhyd-y-groes. Here, one of the largest inland populations of sea campion occurs with the maritime form of *Festuca rubra*, dense tussocks of *Molinea caerulea*, and *Deschampsia flexuosa*. The river contains no aquatic plants because of the high mineral content of the water which contains large amounts of lead, zinc and other elements washed down from the old lead mines.—J. P. Savidge.

BOOK REVIEWS

Huntia: A Yearbook of Botanical and Horticultural Bibliography. Vol. 2. Pp. 304. The Hunt Botanical Library, Carnegie Institute of Technology. Pittsburgh, Pennsylvania. 15th October 1965. Price $7.50 (paper); $8.50 (cloth).

The second volume of Huntia contains eleven original articles covering a wide range of subjects from 'Illustrations from Weinmann's "Phytanthoza iconographia" in Iwasaki's "Honzô zufu" to "Remarkable features in book collations".'

Papers of particular interest to British readers include "Some early American horticultural writers and their works: 1. John Adlum and William Cobbett", by Dorothy S. Manks, the account of the famous William Cobbett (1762-1835) being particulary comprehensive. "The Rev. John Laurence (1668-1732); the man and his books", by John S. L. Gilmour; "Charles Darwin and the perennial flax—a controversy and its implications", by Herbert G. Baker; "The five brethren of the rose; an old botanical riddle", by William T. Stearn, an account of an old riddle based on the five sepals of *Rosa canina* and other dog-roses and "Notes on some portraits of British botanists and Gardeners", by Alice M. Coats, those noted being William Aiton (1731-93), Sir Joseph Banks (1743-1820), Rev. Henry Compton (1632-1713), Thomas Coulter (1793-1846), William Dampier (1652-1715), James Dickson (1738-1822), Thomas Fairchild (1667-1729), Rev. Stephen Hales (1677-1761), Gertrude Jekyll (1843-1935), George Loddiges (1784-1846), Francis Mason (1741-1806), William Roscoe (1753-1831), William Pitcairn (1711-91), John Shepherd (1764-1836), John Sibthorp (1758-96), John Stuart, Third Earl of Bute (1713-92) and John Tradescant, the younger (1608-62).

The volume also gives an account of current departmental studies being carried out at the Hunt Botanical Library.—D. H. Kent.

Plant Drugs that Changed the World. By Norman Taylor. Pp. viii + 275 with 1 plate. George Allen & Unwin Ltd., London. 1966. Price 30s.

As its title implies, this book is a collection of histories of plant drugs that have left their mark on civilisation. It ventures into the fields of botany, medicine, chemistry, and anthropology, but it is never technical; it is written for the intelligent layman, and to all appearances by one. The author's stories are really about people: explorers, doctors, scientists, and churchmen, primitive tribes and big business, all these and more are there to enthral us. In the course of this, Mr. Taylor embellishes his narrative with colourful superlatives, figures of speech, and all the rest of the stock-in-trade of the professional storyteller. And it should here be mentioned that, despite the imprint of an English publisher, this is an American book in American spelling with American allusions, some of which (like "the familiar jimsonweed") may be lost on the English reader.

It is interesting (to digress slightly) that although the author consistently uses "mentally ill" as a euphemism for "insane", he is not ashamed to use a round Shakespearean word for a woman of light virtue. Not surprisingly for a book of this sort, minor errors are frequent, particularly where it deals with organic chemistry. Several names are mis-spelt, but there are not many printer's errors. A good index is provided, also a bibliography of impressive scope; although one wonders what the culture-vulture, starting from the present book, will make of a Reichstein steroid paper or Losinskaya's monograph of the genus *Rheum*. Illustrations are confined to plant sketches which are artistic rather than botanical, and a photo-plate of the memorial tablet to William Withering, whose potted biography forms the chapter on *Digitalis*.

This is a book which could be read with entertainment and not a little instruction by any amateur botanist. It should, however, be kept strictly out of reach of students reading for an exam.—D. P. YOUNG.

BOOKS RECEIVED

The Flora of Pavagadh (Gujarat State, India). The Maharaja Sayajirao University of Boroda, Botanical Memoirs: No. 1. By A. R. Chavan and G. M. Oza. Pp. VI-273 and 2 plates. Department of Botany, Faculty of Science, M. S. University of Baroda, Baroda, 1966. Price Rs. 12/-.

Mountain Flowers of New Zealand. By Nancy M. Adams. Pp. 32. A. H. & A. W. Reed, Wellington, Auckland & Sydney, 1965. Price 16/-.

OBITUARY

NOEL YVRI SANDWITH (1901-1965).—Noel Sandwith died on 7th May, 1965, unexpectedly and with little premonitory illness. His scholarly mind encompassed a wide range of interests and his courteous kindliness and constant willingness to help both strangers and friends gained for him the affection of many people in many lands.

He was born on 8th September, 1901, at Harworth, in Nottinghamshire, where his father, the Reverend Edward Pitcairn Sandwith, was vicar. His father's sudden death caused the family to move to Bristol in 1909, where his mother, Cecil Ivry Sandwith, became one of the circle of enthusiastic field-botanists who contributed material to James Walter White for his admirable Flora of Bristol. From her, Sandwith acquired a love and keen eye for British plants which he never afterwards lost. Indeed, until her death in February 1961, he and his mother found constant pleasure and inspiration in botanising together and in jointly and annually chronicling additions to the flora of the Bristol region.

Noel Sandwith was educated at Clifton College and Keble College, Oxford, where he read classics. While still at Clifton he made the outstanding discovery of *Scorzonera humilis* in Dorset. The genus was previously unknown in Britain, and Sandwith showed it to G. C. Druce, who wrote an account in *Rep. botl. Soc. Exch. Club Br. Isl.*, 1915: **4**, 202 (1916), and 1916: **4**, 419-421 (1917).

In 1924, Sandwith entered the Kew Herbarium as a Temporary Botanist, where he remained until his death, except for a short period from 1942-1945 during which he was seconded to the Foreign Office, on account of his knowledge of modern Greek. From the start his work was directed mainly towards tropical America, and for many years he was in charge of the Section of the Herbarium dealing with that area. He became an authority of world repute on the family *Bignoniaceae*, which contains so many spectacularly lovely species and is so richly developed in tropical America.

He visited British Guiana twice, in 1929 and 1937, where he made fine collections. Travelling gave him great pleasure, in doing which his wide knowledge of modern languages was particularly useful. Spain, for which he cherished an especial love, he repeatedly visited at intervals from 1925 until near the time of his death, and his critical knowledge of the flora of that country won him respect and co-operation from eminent Spanish botanists. Other visits were made to Greece, Albania and Libya, each trip yielding rich botanical collections. His last journey was to Brazil, shortly before his death, to attend a meeting in Sao Paulo to discuss the projected 'Flora Neotropica'.

This is not the place to deal with all Sandwith's numerous contributions to systematic botany, but to try to sum up his effect, as a man and a botanist, on British botany in general and our Society in particular.

Although he had an enviably critical and ready knowledge of the British flora in general, it is perhaps natural to think first and foremost of his detailed experience and love of the flora of the Bristol region. His boyhood find of *Carum carvi* by Hotwells Station in 1911 was published in White's *Flora of Bristol* (1912). After the death of White, Sandwith's mother took over the task of compiling the "annual notes" (as he called them) on Bristol botany, published in the *Proceedings of the Bristol Naturalists' Society*. From 1948 onwards these papers were written jointly by Sandwith and his mother, and after his mother's death in 1961 by himself alone. His knowledge of those parts of Somerset and Gloucestershire forming the Bristol area was wide and intimate, but he was particularly attracted by the Somerset peat-moors, which he often visited, and where he had seen such rarities (for that region) as *Andromeda* and *Vaccinium oxycoccos*. He became Botanical Recorder for North Somerset, v.c. 6, and after his mother's death formed and maintained a detailed card-catalogue of records from the Bristol area, now in the possession of Dr. A. J. Willis of the University of Bristol, which will be invaluable in the compilation of any new flora of the Bristol region.

Adventive plants held a keen interest for Sandwith and his mother, which as far as Bristol was concerned culminated in the appearance of the careful and valuable account entitled 'The Adventive Flora of the Port of Bristol', published in *Rep. botl. Soc. Exch. Club Br. Isl.*, 1932: **10**, 314-363 (1932). His critical knowledge of plants in general and his access to the collections at Kew enabled this paper to set unusually high standards of identification and nomenclature. Up to the autumn before his death he was visiting Avonmouth, where he and his mother had found so many unusual alien plants, though lamenting the prevalent passion among the railway authorities for weedkillers and tidy sidings.

Sandwith's knowledge of the British flora was very wide and there were few species that he did not know well or had not seen alive in their natural habitats. He shared with his mother a particular interest in aquatics, and was one of the few British botanists who really knew well the charophytes. Those esoteric domains of the ultra-specialist, *Rubus* and *Hieracium*, had little attraction for him, I think, although he had a keen interest in *Rosa*, for which at one time he acted as referee for our Society.

He was also for a while our referee for *Amaranthus* and for many years, until his death, for *Fumaria*. In addition to the discovery, already mentioned, of *Scorzonera*, he was responsible for various important additions to the British flora. *Eleocharis austriaca* Hayek was first found in Britain by him, by the River Wharfe in Yorkshire, in 1947, although its true identity was not elucidated until some years later, in 1961, when it was shown by himself and Walters at an Exhibition Meeting of the B.S.B.I.

His keen and critical eye also recognised on Ben Lawers, an area one would have thought already sufficiently closely examined by other keen and critical eyes, the mysterious *Carex*, near *C. parallela*, about which he wrote in *Watsonia*, **11**, 279-281 (1952), and whose real identity still remains to be settled.

Sandwith's interests were not limited to flowering plants: he and his mother were both interested in hepatics, and new and outstanding records both of hepatics and mosses appeared latterly in the annual reviews of Bristol botany. He was a member of the British Bryological Society.

Although, perhaps, he felt happiest when botanising in the field, he also took great pleasure in his official and private herbarium work. Both visitors to Kew and his colleagues there have come to recognize and value the penetrating and helpful critical comments which he wrote, usually in pencil, on so many sheets of plants in the Kew Herbarium.

The private herbarium of British plants, formed by his mother and himself, was a fine one, carefully collected and looked after, though mounted on unusually small sheets in order to fit a readily obtainable size of filing drawer. It was divided into two parts: one containing native and established plants, according to the standard of the London Catalogue, the other containing other adventive plants. Under the terms of his will the first part was bequeathed to the Rijksherbarium at Leiden in Holland, while the second part—the adventives—together with his bryological collection, was presented after his death to the Department of Botany of the University of Bristol.

Besides service to our Society as a referee for various critical genera, he gave it long and valuable support in other more general ways. He was a member of the General Committee from 1936-1945, the Editorial Subcommittee from 1937-1947, and after the administration of the Society had been re-organised, he served on the Publications Committee from 1955 until his death. He was also a member of the Panel of Specialists, with special responsibility for Systematic Works and Monographs.

Sandwith's outlook was that of the scholar rather than the man of the world, and perhaps the artist rather than the scientist. In addition to the fluent Latin that might be expected from an Oxford classicist, which led to a frequent (sometimes, he felt, too frequent) demand for his services in drawing up Latin descriptions for less gifted colleagues, he had an extensive knowledge of modern languages, and his fluent, elegant style of English made his writings a pleasure to read.

Any ostentation was repugnant to his modest and unaffected personality. The crowded meeting likewise held little appeal in comparison with the company of one or a few people of kindred temperament and congenial tastes. Then he relaxed and his quiet sense of humour and the full warmth of his personality emerged, and it was easy to realise why those who knew him best held him in such abiding esteem and affection. To young people particularly he gave generous help and communicated some of his own enthusiasm.

In these days of early, if not premature, specialisation, an extensive critical knowledge of plants is becoming steadily more rare. He possessed it to a degree granted only to very few. Those who knew him mourn him and miss him, and look in vain for his kindliness, wisdom and knowledge.

A full list of his botanical works has been published in Taxon, **15** (7), 249-255 (1966). It will be sufficient here to mention those concerning the British flora.

PRINCIPAL PAPERS AND NOTES RELATING TO THE BRITISH FLORA

1926

Ranunculus ophioglossifolius Vill. in Western Gloucestershire, *J. Bot., Lond.*, **64**, 221. (C. I. & N. Y. Sandwith.)

Caucalis daucoides L., var. *muricata* (Bisch.) G. & G., *Rep. botl. Soc. Exch. Club Br. Isl.*, 1925 : **7**, 772-774.

1932

New Records for Pembrokeshire, *J. Bot., Lond.*, **70**, 237-239. (A. H. G. Alston. C. I. & N. Y. Sandwith.)

The Adventive Flora of the Port of Bristol, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1932 : **10**, 314-363. (C. I. & N. Y. Sandwith.)

1935

Epilobium adenocaulon Hausskn. in Britain, *J. Bot., Lond.*, **73**, 177-184. (G. M. Ash & N. Y. Sandwith.)

1936

Vogelia apiculata (Fisch., Mey., et Avé Lall.) Vierhapper, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1935 : **10**, 102.

1941

An interesting Crucifer on a London Shelter, *J. Bot.. Lond.*, **79**, 86-87. (Francis Druce & N. Y. Sandwith.)

1942

Kohlrauschia prolifera (L.) Kunth forma *laevis* (Clav.) Sandwith, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1939-40 : **12**, 252-253.

Juncus acutiflorus Ehrh. forma *congestus* (Lange) Sandwith, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1939-40 : **12**, 260.

1945

Hypericum linariifolium Vahl in Radnorshire, *North Western Naturalist*, **20**, 274.

A Yellow-Fruited Guelder Rose in Surrey, v.c. 17, *North Western Naturalist*, **20**, 274.

Zannichellia gibberosa Rchb. in North Somerset, v.c. 6, *North Western Naturalist*, **20**. 275.

1948

Raphanus raphanistrum L. *β hispidus* Lange, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1946-7 : **13**, 257-258.

Amaranthus blitoides S. Wats., *Rep. botl. Soc. Exch. Club Br. Isl.*, 1946-47 : **13**, 269-271. (J. P. M. Brenan & N. Y. Sandwith.)

Amaranthus acutilobus Uline & Bray, *Rep. botl. Soc. Exch. Club Br. Isl.*, 1946-47 : **13**, 271-272.

The Glabrous White Campion, *The Naturalist*, April-June 1948 : 45-46.

Aecidia of Barley Rust in Britain, *Nature*, **162**, 461. (R. W. G. Dennis & N. Y. Sandwith.)

Bristol Botany in 1947, *Proc. Bristol Nat. Soc.*, **27** (4), 203-208. (C. I. & N. Y. Sandwith.)

1949

Bristol Botany in 1948, *Proc. Bristol Nat. Soc.*, **27** (5), 383-392. (C. I. & N. Y. Sandwith.)

The Glabrous White Campion, *The Naturalist*, April-June 1949 : 47.

1950

Bristol Botany in 1949, *Proc. Bristol Nat. Soc.*, **28** (1), 17-23. (C. I. & N. Y. Sandwith.)

1951

Trifolium petrisavii Clementi, *Watsonia*, **2**, 106-107.
Bristol Botany in 1950, *Proc. Bristol Nat. Soc.*, **28** (2), 169-175. (C. I. & N. Y. Sandwith.)

1952

A Mysterious *Carex* on Ben Lawers, *Watsonia*, **11**, 279-281.
Bristol Botany in 1951, *Proc. Bristol Nat. Soc.*, **28** (3), 243-248. (C. I. & N. Y. Sandwith.)

1953

Bristol Botany in 1952, *Proc. Bristol Nat. Soc.*, **28** (4), 305-314. (C. I. & N. Y. Sandwith.)

1954

Bristol Botany in 1953, *Proc. Bristol Nat. Soc.*, **28** (5), 379-386. (C. I. & N. Y. Sandwith.)
Obituary : Mrs. M. L. Wedgwood, *Proc. bot. Soc. Br. Isl.*, **2**, 114-115.

1955

Bristol Botany in 1954, *Proc. Bristol Nat. Soc.*, **29** (1), 17-24. (C. I. & N. Y. Sandwith.)

1956

Bristol Botany in 1955, *Proc. Bristol Nat. Soc.*, **29** (2), 101-108. (C. I. & N. Y. Sandwith.)

1957

Bristol Botany in 1956, *Proc. Bristol Nat. Soc.*, **29** (3), 179-186. (C. I. & N. Y. Sandwith.)

1958

A Second Species of *Uromyces* on British Spurges, *Kew Bull.*, **12**, 372. (R. W. G. Dennis & N. Y. Sandwith.)
Bristol Botany in 1957, *Proc. Bristol Nat. Soc.*, **29** (4), 343-352. (C. I. & N. Y. Sandwith.)

1959

Obituary : A. H. G. Alston, *Proc. bot. Soc. Br. Isl.*, **3**, 361-365.
Bristol Botany in 1958, *Proc. Bristol Nat. Soc.*, **29** (5), 423-432. (C. I. & N. Y. Sandwith.)

1960

The identity of *Saracha acutifolia* Miers, *Kew Bull.*. **14**, 231-233.
Bristol Botany in 1959, *Proc. Bristol Nat. Soc.*, **30** (1), 15-20. (C. I. & N. Y. Sandwith.)

1961

Obituary : C. I. Sandwith, *Proc. Bristol Nat. Soc.*, **30** (2), 103-106.
Bristol Botany for 1960, *Proc. Bristol Nat. Soc.*, **30** (2), 107-112. (C. I. & N. Y. Sandwith.)

1962

Bristol Botany for 1961, *Proc. Bristol Nat. Soc.*, **30** (3B), 239-244.

1963

Bristol Botany for 1962, *Proc. Bristol Nat. Soc.*, **30** (4), 301-308.

1964

Bristol Botany for 1963, *Proc. Bristol Nat. Soc.*. **30** (5), 379-384.

1965

Bristol Botany in 1964, *Proc. Bristol Nat. Soc.*, **31** (1), 25-32.

—J. P. M. Brenan.

PERSONALIA AND NOTICES TO MEMBERS

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr. F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr. Perring (address as above) include:

1. 35 mm. filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards. Price 15/- per hundred.
3. Individual Record Cards. Price 10/- per thousand.
4. Vice-county maps (quarto size): Collin's "New Naturalist" at 1s. 0d. each, and *Atlas of the British Flora* base maps at 3d. each.
5. Base maps of the British Isles with 100 km. grid (quarto) at 2d. each.
6. Corrections to the *Atlas of the British Flora*: free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed would you please send us a copy?

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF "*WATSONIA*" AND "*PROCEEDINGS*"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3. Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part. 5, and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. D. Streeter, 193 London Road, East Grinstead, Sussex, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex), who will send a form listing the detailed information required by the Nature Conservancy. The forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

CHALK GRASSLAND

An attempt is being made to collate all available information on chalk grassland ecology. In this connection it would be appreciated if any member engaged in having information on any aspect of research connected with chalk conservation, ecology or vegetation would please send details to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex). If this information has already been sent either to the Nature Conservancy's Research Section at Monks Wood or to the Secretariat of the County Naturalists' Trust Committee of the S.P.N.R. details are not required but only a note indicating the subject of the work.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Secretary of the Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seeds or other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

THE BRITISH MUSEUM MULL PROJECT

The Department of Botany of the British Museum (Natural History) has started a field programme in which it is intended that a floristic and descriptive ecological survey of the Island of Mull and its off-lying small islands (v.c. 103, Mid Ebudes in part) will be made during the course of the next five years. It is envisaged that the work will culminate in the production of a publication of the "County Flora" type.

Since, unlike the authors of most county Floras, the department is equipped with staff, collection and library to deal, at least in theory, with all groups of plants, it is hoped that the final publication will be of unusually wide taxonomic coverage, covering most cryptogams, and will make a special feature of the ecological and geographical relationships of the flora.

It will be evident to those experienced in work of this kind, that the proposed programme is ambitious and represents a substantial commitment, in an entirely new field of activity, of the department's time and resources. For this reason we shall greatly welcome and appreciate offers of help from all interested persons. We have been very fortunate in gaining the active support and assistance of several Scottish botanists who are interested in the area, and we are already indebted to a number of specialists for the benefit of their expert opinions in certain critical groups.

During the past summer, the department had two parties in the field and even this limited experience has revealed new information of great interest, especially on the cryptogamic groups in the area, which have been very little explored. We shall be very pleased to give information relating to transport, accommodation and local botany, to anyone interested in visiting the island. While its weather cannot be recommended, the scenery and interest of the area does much to outweigh this disadvantage, and Mull and the associated area can be recommended confidently to those looking for a botanical holiday away from the well trodden paths to the famous shrines. We are well aware that, limited as we are by considerations of distance and time, our work can be greatly enriched by the help of others, which would of course receive appropriate recognition in the final publication.

If you can help or would like any further information, please write in the first instance to J. F. M. Cannon or E. B. Bangerter, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

VERONICA SECTION *BECCABUNGAE*

N. G. Marchant, Botany School, Downing Street, Cambridge, is investigating variation in the species of *Veronica* section *Beccabungae*, and would be very grateful for herbarium specimens and if possible, seeds of these species.

ANNUAL SPECIES OF *SILENE*

Mrs. E. Bari, Botany School, Downing Street, Cambridge, would be grateful for samples of wild-collected ripe seed of annual species of

Silene from Britain or the Continent. Recently collected, unpoisoned herbarium material would be most welcome if a ripe sample could be extracted.

EDITORS OF "WATSONIA"

Dr C. D. K. Cook, Dr M. C. F. Proctor and Dr N. K. B. Robson have been appointed Editors of *Watsonia*.

All manuscripts to be considered for publication in *Watsonia* should be sent to Dr C. D. K. Cook, Hon. Receiving Editor *Watsonia*, The Hartley Botanical Laboratories, The University, Liverpool, 3.

All books to be considered for review in *Watsonia* should be sent to Dr N. K. B. Robson, Hon. Review Editor *Watsonia*, c/o Department of Botany, British Museum (Natural History), London, S.W.7.

CONTRIBUTIONS TO "PROCEEDINGS"

All contributions to "Proceedings" should be sent to The Hon. Editor, E. F. Greenwood, c/o The City of Liverpool Museums, William Brown Street, Liverpool, 3.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

LOCAL ORGANISATION

REGIONAL REPRESENTATIVES AND COUNTY RECORDERS

Apart from the Officers, Council and the various Standing Committees the Society has, for some years, had in being a network of individual members who act on its behalf in every part of the country. For this purpose the British Isles are divided into eight REGIONS, each of which elects a *Regional Representative* to sit on Council. A Regional Committee has been set up in three regions, and it is hoped that every region will set one up eventually so that many of the Society's present activities will be duplicated on a regional basis.

The functions of the Regional Representative are broadly of an administrative nature. It is the intention that they should act as the Society's official representatives in the region, who can be consulted readily on a wide range of matters pertaining to the region, and that they should act on their own initiative in arranging meetings, etc.

Within each Region *Recorders* have been appointed for each VICE-COUNTY. The Recorder's functions, in contrast, are broadly of a curatorial nature, involving the keeping of records of the local flora and the various related activities which spring naturally from this.

The suggested functions are set out in more detail below.

REGIONAL REPRESENTATIVES (OR COMMITTEES IN IRELAND, SCOTLAND, AND WALES)

1. To keep in touch with members within their regions and as far as possible to arrange meetings for their benefit.
2. To keep in touch with all institutions with a botanical connection in the region and to develop botanical interest by working through local Natural History Societies and local Naturalists' Trusts.
3. To assist the officers, and leaders of field meetings in connection with any meetings of the Society in their Region.
4. To circularise various bodies in the region about the programme of activities of the Society stressing that non-members are welcome, and drawing to their attention the names and addresses of the Recorders and Referees and Specialists, and the great range of services which they offer.

RECORDERS

1. To promote work on and to answer queries from members about the flora of their areas. (This does not include supplying information about localities for rare plants.)
2. To assist the Editor of *Proceedings* by collecting and sending in records of national interest, and to check records made in the recorder's area which have been contributed for publication by other members of the Society.

3. To maintain a card index of the occurrence of at least the more local species in their area, noting particularly additions, decreases and disappearances to such standard Floras of their area as may have been published.
4. To make arrangements to ensure that such a card index is generally available to members for consultation, and that the responsibility for its maintenance can be passed easily to a successor when a Recorder relinquishes his position.
5. To collaborate with the Biological Records Centre, Monks Wood Experimental Station, Huntingdon, by sending new records for 10 km. squares to them from time to time for incorporation into future editions of the "*Atlas of the British Flora*".

LIST OF REGIONAL SECRETARIES, REGIONAL REPRESENTATIVES, AND RECORDERS (revised January 1967)

The members listed below have agreed to act in the capacities mentioned for the Watsonian vice-counties in question. All addresses (except where given) can be obtained from the List of Members (see *Proceedings, B.S.B.I.*, Vol. 6, Pt. I, June 1965).

SOUTH-WEST

Regional Representative	*Vice-County*	*Recorder*
R. G. B. Roe	0 Channel Isles	
	Jersey	Mrs F. Le Sueur
	Other Islands	D. McClintock
	1 W. Cornwall	L. J. Margetts [Wyndham, Treskullard, Redruth]
	1b Isles of Scilly	J. E. Lousley
	2 E. Cornwall	Mrs E. L. Almond
	3 & 4 S. & N. Devon	Miss M. A. Turner
	5 S. Somerset	A. D. Hallam
	6 N. Somerset	R. G. B. Roe
	7 & 8 N. & S. Wilts	J. D. Grose
	9 Dorset	Dr H. J. M. Bowen
	10 Isle of Wight	Mrs P. Yule
	11 & 12 S. & N. Hants	Mrs P. Yule
	33 & 34 E. & W. Gloucester	Miss D. E. de Vesian

SOUTH-EAST

P. J. O. Trist	13 W. Sussex	O. Buckle
	14 E. Sussex	D. P. Philcox
	15 & 16 E. & W. Kent	Dr F. Rose
	17 Surrey	Dr D. P. Young
	18 & 19 S. & N. Essex	S. T. Jermyn
	20 Herts	Dr J. G. Dony
	21 Middlesex	D. H. Kent
	22 Berks	Dr H. J. M. Bowen
	23 Oxford	A. R. Perry

SOUTH-EAST (*Continued*)

Regional Representative	*Vice-County*	*Recorder*
	24 Bucks	P. R. Knipe
	25 & 26 E. & W. Suffolk	F. W. Simpson
	27 E. Norfolk	E. A. Ellis
	28 W. Norfolk	E. L. Swann
	29 Cambridge	Dr F. H. Perring
	30 Bedford	Dr J. G. Dony
	31 Hunts	T. C. E. Wells

MIDLANDS

Dr D. M. Moore	32 Northants	Mrs H. M. Gent
	36 Hereford	Mrs L. E. Whitehead
	37 Worcester	F. Fincher
	38 Warwick	R. C. Readett
	39 Stafford	E. S. Edees
	40 Salop	C. A. Sinker
	53 & 54 S. & N. Lincoln	Miss E. J. Gibbons
	55 Leicester	Prof. T. G. Tutin
	55b Rutland	K. G. Messenger
	56 Nottingham	R. C. L. Howitt
	57 Derby	Miss K. M. Hollick

NORTH-WEST

Dr C. D. K. Cook	58 Chester	A. Newton
	59 S. Lancaster	Miss V. Gordon
	60 W. Lancaster	E. F. Greenwood
	69 Westmorland	Mrs F. L. Woodman
	70 Cumberland	Miss C. W. Muirhead
	71 Isle of Man	D. E. Allen

NORTH-EAST

Dr M. E. Bradshaw	61 S.-E. York	Dr W. A. Sledge
	62 N.-E. York	Miss C. M. Rob
	63 S.-W. York	Dr W. A. Sledge
	64 Mid-W. York	Dr W. A. Sledge
	65 N.-W. York	Miss C. M. Rob
	66 Durham	Rev. G. G. Graham
	67 S. Northumberland	Dr G. A. Swan
	68 Cheviotland	Dr G. A. Swan

WALES

Secretary of Regional Committee: Mrs H. R. H. Vaughan	35 Monmouth	R. G. Ellis [Nationa Museum of Wales, Cardiff]
	41 Glamorgan	R. G. Ellis
	42 Brecon	R. G. Ellis

WALES *(Continued)*

Regional Representative	*Vice-County*	*Recorder*
	43 Radnor	Miss A. C. Powell [Orchard Gate, Winforton, Hereford]
	44 Carmarthen	Mrs H. R. H. Vaughan & R. F. May
	45 Pembroke	T. A. W. Davis
	46 Cardigan	Dr J. P. Savidge
	47 Montgomery	C. A. Sinker
	48 Merioneth	P. M. Benoit
	49 Caernarvon	M. Morris
	50 Denbigh	J. M. Brummitt
	51 Flint	M. G. Wynne
	52 Anglesey	R. H. Roberts

SCOTLAND

Secretary of Regional Committee: Miss E. P. Beattie	72 Dumfries	Dr H. Milne-Redhead
	73 Kirkcudbright	Dr H. Milne-Redhead
	74 Wigtown	Dr H. Milne-Redhead
	75 Ayr	R. Mackechnie
	76 Renfrew	R. Mackechnie
	77 Lanark	R. Mackechnie
	78 Peebles	D. J. McCosh
	79 Selkirk	Dr H. Milne-Redhead
	80 Roxburgh	Dr H. Milne-Redhead
	81 Berwick	A. G. Long
	82 Haddington	Miss E. P. Beattie
	83 Edinburgh	Miss E. P. Beattie
	84 Linlithgow	Miss E. P. Beattie
	85 Fife	Miss C. W. Muirhead
	86 Stirling	B. W. Ribbons
	87 W. Perth	B. W. Ribbons
	88 Mid-Perth	A. W. Robson
	89 E. Perth	A. W. Robson
	90 Forfar	Sir George Taylor
	91 Kincardine	Mrs A. H. Sommerville
	92 & 93 S. & N. Aberdeen	Dr C. H. Gimingham
	94 Banff	Miss M. McCallum Webster
	95 Elgin	Miss M. McCallum Webster
	96 Easterness	A. Slack
	96b Nairn	Miss M. McCallum Webster
	97 Westerness	Dr Derek Ratcliffe
	98 Main Argyll	Prof. K. N. G. MacLeay
	99 Dunbarton	A. McG. Stirling

SCOTLAND (*Continued*)

Regional Representative	*Vice-County*	*Recorder*
	100 Clyde Isles	Mrs A. H. Sommerville
	101 Kintyre	A. G. Kenneth
	102 S. Ebudes	Miss C. W. Muirhead
	103 Mid Ebudes	
	Mull	J. F. M. Cannon
	Other Isles	Miss C. W. Muirhead
	104 N. Ebudes	
	Skye	Mrs C. W. Murray
	Rhum	Dr J. Eggeling
	Other Isles	Dr R. E. C. Ferreira, [c/o Nature Conservancy, 12 Hope Terrace, Edinburgh 9]
	105 W. Ross	Dr D. M. Henderson
	106 E. Ross	Miss U. K. Duncan
	107 & 108 E. & W. Sutherland	J. Anthony [120 Trinity Road, Edinburgh]
	109 Caithness	Dr R. E. C. Ferreira
	110 Outer Hebrides	Miss M. S. Campbell
	111 Orkney	Miss E. R. Bullard
	112 Shetland	W. Scott

IRELAND

Secretary of Regional Committee: Rev. Fr J. J. Moore	1 & 2 S. & N. Kerry	Prof. D. A. Webb
	3, 4 & 5 W., Mid & E. Cork	Miss M. P. S. Scannell
	6 Waterford	I. K. Ferguson
	7 S. Tipperary	Prof. D. A. Webb
	8 Limerick	Prof. D. A. Webb
	9 Clare	Prof. D. A. Webb
	10 N. Tipperary	Prof. D. A. Webb
	11 Kilkenny	Prof. D. A. Webb
	12 Wexford	Miss E. M. Booth
	13 Carlow	Miss E. M. Booth
	14 Leix	Prof. D. A. Webb
	15 S.-E. Galway	Dr M. Mitchell
	16 W. Galway	Prof. D. A. Webb
	17 N.-E. Galway	Dr M. Mitchell
	18 Offaly	Fr J. J. Moore
	19 Kildare	Fr J. J. Moore
	20 Wicklow	H. J. Hudson
	21 Dublin	H. J. Hudson
	22 Meath	D. Sinnott [Bot. Dept., National Museum, Dublin]
	23 Westmeath	Prof. D. A. Webb

Regional Representative	*Vice-County*	*Recorder*
	24 Longford	Prof. D. A. Webb
	25 Roscommon	Prof. D. A. Webb
	26 & 27 E. & W. Mayo	P. J. O'Hare [Peatland Experimental Station, Glenamoy, Ballina, Mayo]
	28 Sligo	Prof. D. A. Webb
	29 Leitrim	Prof. D. A. Webb
	30 Cavan	R. C. Faris [Dunsandle, Corbawn Lane, Shankill, Co. Dublin]
	31 Louth	D. Sinnott
	32 Monaghan	Fr J. J. Moore
	33 Fermanagh	R. D. Meikle
	34 E. Donegal	Miss N. M. Hamilton
	35 W. Donegal	Prof. D. A. Webb
	36 Tyrone	Miss M. P. H. Kertland
	37 Armagh	Miss Dawson [The County Library, The Mall, Armagh, Co. Armagh]
	38 Down	Mrs A. R. Pugh
	39 Antrim	Miss G. E. Drennan
	40 Londonderry	Miss N. M. Hamilton

PANEL OF REFEREES AND SPECIALISTS

Please read carefully before submitting specimens

In all instances it is understood that a complete plant (excluding root except in annuals and where specified) will be submitted together with any necessary notes on colour, habitat and locality (not for publication without sender's permission). For tall herbaceous plants the inflorescence and upper leaves, a short mid-section, and radical leaves, should be included, and when in doubt it is advisable to consult the referee beforehand as to the best methods of collection and preservation of material for subsequent determination. Where extensive hybridisation is known, or suspected to occur, samples should be sent showing the range of variation in the population. The abbreviations after the referees' names are of features and parts that are essential for accurate determination. If these are not sent the referee may refuse to determine the specimen.

Except where specified, pressed and dried material should be sent and a note enclosed as to whether the specimen can be retained by the referee or is to be returned to the sender. It should be remembered that critically named material is of greater value when located in large regional or national collections where it is available for consultation by future workers. If the specimen is to be returned, postage stamps must be included or return postage refunded on receipt.

The arrangement of the list is that of Dandy's "*List of British Vascular Plants*" (1958) It must be realised that the referee does not necessarily agree with the taxonomic or nomenclatorial treatment of his group in Dandy's List or in any other publication and that he may also qualify his identification with a query or "cf".

The referees' names in the List are given in alphabetical order when two or more are available for consultation. The addresses of most of the referees are to be found in the list of members, but some referees are not members and some others do not want material sent to the address given in the list. In these instances the specimens should be sent to the referee c/o the institution specified.

Do not forget to enclose postage for reply
(preferably a stamped addressed envelope or stamped addressed label for parcel)

ABBREVIATIONS

bds. = buds.
ckn. = catkins.
cn. = colour notes (with dried material).
fl. = flowers.
fre. = fresh material preferred.
mfr. = mature fruit.
ml. = mature leaves.
r. = roots or underground parts.
rl. = radical leaves.
s. = seeds.

sm. = spirit material.
stsh. = sterile shoots.
yfr. = young fruits.
BM = Botany Department, British Museum (Nat. Hist.), London, S.W.7.
CFI = Commonwealth Forestry Bureau, Commonwealth Forestry Institute, South Parks Road, Oxford.
FRS = The Nature Conservancy, Furzebrook Resarch Station, Wareham, Dorset.
K = The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.
L = Genetics Department, University of Liverpool.
NMW = The Botany Department, National Museum of Wales, Cardiff.
UCD = Botany Department, University College, Dublin.
UCL = Botany Department, University College, London, W.C.1.
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